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Technical Memorandum

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Subject	**Activity 5: SIPS Route Study – Deerwood III WTP to Greenland WTP**
Project Name	JEA Water/Wastewater Capital Program Management, Task Order No. S2, Southside Integrated Piping System (SIPS)
Attention	Beth DiMeo, JEA
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Date	January 20, 2020
JEA Contract No.	182848
Version	FINAL (Updated 09/30/19 Version)

1. Project Background

Following the completion of the Total Water Management Plan (TWMP) in 2014, the Southside Integrated Piping System (SIPS) aims to further distribute JEA's North Grid water supply to multiple South Grid facilities. The current TWMP system connections to the South Grid are few, and have difficulty overcoming the backpressure from South Grid Water Treatment Plants (WTPs); therefore, they are limited at meeting demands on the South Grid. The current TWMP system connections are in need of support to meet demands in the southern portion of the South Grid where significant customer growth is occurring from new land development. The SIPS project will improve delivery of North Grid water to the South Grid by converting the TWMP system to a raw water transmission system and constructing multiple strategic pipeline projects to deliver raw water where the existing WTPs can be used to meet demands. Completion of the SIPS project will increase reliability and capacity on the South Grid, while minimizing long-term water quality risks.

As part of JEA's iWATER program, five essential pipeline projects totaling 138,000 linear feet (LF) of 16-, 24-, and 30-inch raw water mains are outlined within the SIPS scope of work. Near-term activities include route studies of these pipelines, with two projects (Southside Blvd Intertie to Deerwood III WTP and Deerwood III WTP to Greenland WTP) to be completed within the first 90 days. Studies for the three remaining routes are to be completed in the subsequent Task Order No. S1 (TO-S1; beginning October 2019).

2. Purpose

The purpose of this route study is to identify and evaluate viable route options prior to finalizing route selection and proceeding with survey, conceptual design, permitting, and final design. The Jacobs team used available aerials; topographic, utility and property maps; geographic information system (GIS) information; as well as comprehensive field investigations to determine the viability of multiple routes. This technical memorandum (TM) will focus on potential routes for a 30-inch raw water main connecting the Deerwood III WTP to the Greenland WTP (Deerwood to Greenland). Furthermore, this TM will provide an

assessment for the available Design and Construction Delivery Methods to support the selection of the most optimal route and delivery to optimize JEA's investment and maximize project scheduling.

3. Project Description

This route study evaluates each alignment based on the following criteria: cost; environmental, community, and customer impacts; constructability; available right-of-way and easements; existing utilities; trees; permitting; and operation and maintenance considerations. A summary of each evaluation is presented to facilitate selection of the final route.

This pipeline route study is focused on identifying a corridor for a 30-inch raw water main from Deerwood to Greenland. An initial route was previously developed during the iWATER Program and is evaluated in this route study as the Base Route. Additionally, there are four alternate routes being considered along portions of the Base Route. The Deerwood to Greenland Base Route is largely within the JEA I-295 Electric Transmission Line (T-Line) and the JEA Greenland WTP property. Other than several roadway crossings, the Base Route alignment is not within any road right-of-way.

Alternate routes do not provide a completely new route (start to finish) to the Base Route. Rather, the alternatives are provided for various portions of the Base Route. Figure GL-OV, presented in Attachment 1, depicts the overall project area including the Base Route and Alternate Routes.

Several roads and wetland areas will potentially require trenchless crossings. Key crossings of major Florida Department of Transportation (FDOT) and City of Jacksonville (COJ) roadways, include, but are not limited to J. Turner Butler Blvd, Gate Parkway, Baymeadows Road, and I-295. For the purposes of this route study, the type of trenchless crossing required (auger bore or horizontal directional drill [HDD]) was preliminarily identified and the approximate length estimated. Trenchless installations are typically needed for crossings of high-traffic roads and environmentally sensitive areas, such as wetlands. Further investigation of the proposed installation method should be completed during the design phase.

To reduce the impact on constructability, existing JEA easements will be considered during route evaluations. Additionally, efforts will be made to reduce the number of permanent utility easements and temporary construction easements that would need to be obtained to complete construction for each route evaluated. Consideration was given to existing road conditions, utility conflicts, available rights-of-way, trees, power poles, structures, and other factors identified in the field that could be a hindrance or impact to the pipeline alignment. The project team conducted a comprehensive field inspection of potential routes to identify details that are not apparent from available records. Using a proprietary application on mobile devices, Jacobs recorded above-ground assets that can help navigate potential routes and alignments.

3.1 Route Evaluations

The Deerwood III WTP to Greenland WTP Route Study comprises multiple route considerations to connect the SIPS pipeline at Deerwood III WTP to the Greenland WTP. The following route options will be discussed in the subsequent sections of this report:

- Base Route: Connection of 30-inch raw water main in the JEA T-Line near the end of St. Johns Bluff Road and Brightman Blvd, continuing southward along the JEA T-Line under J. Turner Butler Blvd to the Point Meadows JEA Substation. From this point the pipe traverses around the Point Meadows Substation to the west side, and then continues southward along the JEA T-Line, crossing Baymeadows Road and I-295 until nearing the JEA Greenland Energy Center (GEC). At this point, the Base Route uses the existing JEA GEC property and adjacent easement to cross along the northern and eastern sides of the JEA GEC until entering the Greenland WTP site on the southeastern portion of the JEA GEC.
- Alternatives to the Base Route:
  - Alternative 1: Using the Base Route up to the Point Meadows Substation, Alternative 1 turns eastward to Point Meadows Drive, then northward to Gate Parkway, where the pipeline will

continue eastward under I-295 to the current end of the paved section of Gate Parkway. At this point, the pipeline will follow a soon-to-be-acquired JEA utility easement eastward from the end of Gate Parkway until reaching the adjacent northeast corner of the Hampton Park neighborhood. At this point, the pipeline will follow JEA's proposed utility easement generally southward all the way to the Greenland Water Reclamation Facility (WRF) site. At the Greenland WRF site, the 30-inch raw water main will follow the northern boundaries of the property until eventually crossing under State Road 9B, where it will then connect to the Base Route at the GEC in the southeastern corner of the property adjacent to the Greenland WTP.

- Alternative 2: A brief alternative to the western portion of the Base Route, Alternative 2 applies near the JEA Point Meadows Substation. Since the substation is surrounded by wet areas and retaining walls along the northern, western, and southern boundaries, an option to circumvent the property to the east was determined necessary. This route uses the Alternative 1 route up to Point Meadows Drive, where it then turns south on Point Meadows Drive until reaching the JEA T-Line driveway, where it heads westward to the JEA T-Line and recombines with the Base Route.
- Alternatives 3A and 3B: Should the JEA T-Line (north/south on the western edge of I-295 and the eastern edge of the Town Center) be deemed non-viable in the Deerwood Route Study, Alternatives 3A and 3B provide an alternative to connect to the Deerwood III WTP and ultimately to the Greenland Base Route. To that end, Alternatives 3A and 3B (referred to as 6A and 6B in the Southside Blvd. Intertie to Deerwood III WTP Route Study) were developed using Burnt Mill Road and Gate Parkway, respectively. One of these alternatives will be required to connect the Deerwood Route to the Greenland WTP, if Deerwood Alternative 2 is selected. Both alternatives use a short easement corridor along Validus Drive to connect to the SIPS raw water main along the Deerwood T-Line 30-inch Raw Water Main – Base Route.

4. 30-inch Raw Water Main – Base Route

4.1 Route Description

The Deerwood to Greenland Base Route connects to the Southside Blvd Intertie to Deerwood III WTP Base Route in the JEA I-295 T-Line at Brightman Blvd, adjacent to Top Golf. The Base Route continues south in the T-Line, generally on the east side of the easement. There are transmission structures with overhead electric and fiber optic on the west side of the easement and a 20-inch reclaimed water main approximately in the middle of the easement (according to JEA GIS information). It should be noted that the JEA Electrical Transmission group prefers a 20-foot radial separation between all electric transmission poles/structures and pressurized utilities. If less than 20-foot separation is needed, then the new raw water main will be required to be installed in a 40-foot long casing centered on the transmission pole or structure. In addition, construction activities are not allowed within 20 feet of any energized conductors. These considerations will be incorporated into the design phase.

To the south of JTB Blvd, there is ongoing development north of Gate Parkway, including a parking lot under the T-Line. Additionally, a temporary fire station was recently built in the eastern portion of the T-Line south of Gate Parkway. These developments will need to be managed in the Base Route.

At the Point Meadows electric substation located within the T-Line near Point Meadows Drive (see Photo 1), the pipe is proposed to go around the west side to avoid the several buried electric lines on the east side of the substation. Two small easements may be needed north of the substation, due to the lack of space between the substation north wall and the property line. Just after the Point Meadows Substation, a 3,000 LF portion of the T-Line is privately owned. An easement for underground rights will be required for this part of the T-Line if the Base Route is selected. As the pipeline alignment approaches the Greenland WTP, it will parallel the existing reclaimed water line along the north service road into the plant. From here, the proposed alignment continues along the inside of the fence to the connection point at the interior of the plant.

Photo 1: Point Meadows Electric Substation (East Side)

4.1.1 Open Cut Crossings

An open cut crossing is recommended for Burnt Mill Road. The traffic volume on Burnt Mill Road is lower than other proposed crossings and there are only two lanes to cross with minimal utilities. This open cut crossing will require a temporary traffic control plan with flagger to control and maintain two-way access.

4.1.2 Auger Bore Crossings

There are two proposed auger bore locations at the crossings for Gate Parkway and Baymeadows Road; the proposed pit locations are shown on Figures GL-BR-11 and GL-BR-29, respectively. Auger bore jacking and receiving pits are expected to be placed within available T-Line space; however, proposed pits may require easements and/or be located in FDOT right-of-way. The Baymeadows Road crossing will require an FDOT utility permit.

4.1.3 Horizontal Directional Drill Crossings

There are four recommended HDDs within the I-295 T-Line; (1) J. Turner Butler Blvd, (2) wetland and private land areas north of Old Still Road, (3) wetland area south of Old Still Road, and (4) I-295. The directional drill at J. Turner Butler Blvd will need to contend with the existing 20-inch reclaimed water line, transmission poles with overhead utilities, and underground fiber. Additionally, this location contains a failed HDD attempt (see Photo 2) for the reclaimed water main to the west of the 20-inch reclaimed water main GIS location. See Figures GL-BR-7 through GL-BR-8 for proposed drill locations at J Turner Butler Blvd. The drill under FDOT I-295 is shown on figures GL-BR-51 and GL-BR-52. The drill crossing State Road 9B will require navigating underground electric, as well as maintaining required separation from the existing 20-inch reclaimed water main. Both the J. Turner Butler Blvd and I-295 crossings will require an FDOT utility permit.

Photo 2: Failed Reclaimed Water Main HDD (exposed pipe in T-Line north of JTB)

4.1.4 Tree Impacts

The Deerwood to Greenland Base Route is within the JEA I-295 T-Line for the majority of the route prior to entering the GEC/Greenland WTP site. After exiting the JEA T-Line and following the Greenland WTP service road, tree clearing may be needed depending on final pipeline alignment. Some minimal tree clearing can be expected around the west side of the substation at Point Meadows Drive.

4.2 Summary

Critical components that differentiate the Base Route from the alternate routes include total pipeline length, assessment of maintenance of traffic (MOT), permitting, easements, and local community impacts. The Base Route will be used as a base cost for comparative purposes to the alternate routes provided herein. The Base Route provides the following characteristics:

- 43,220 LF of 30-inch raw water main pipe.
- One open cut crossing of Burnt Mill Road.
- Two Auger Bore Crossings identified, totaling 435 LF (Gate Parkway and Baymeadows Road).
- Four HDDs identified, totaling 6,855 LF (Two wetland crossings near Old Still Road, J. Turner Butler Blvd, and I-295).
- The Base Route is primarily within the JEA T-Line parallel to I-295.
- Tree clearing may be expected along the GEC/Greenland WTP north Service Road.
- The Base Route alignment includes work within three FDOT rights-of-way: JTB, Baymeadows Road and I-295.

- Easements required for two properties north of Point Meadows Substation and privately owned property along the T-Line between Point Meadows Substation and Old Still Road.

5. 30-inch Raw Water Main – Alternate Routes

Alternate routes were evaluated to provide alternatives to difficult and/or congested sections of the Base Route. The alternate routes replace sections of the Base Route and are outlined in each section below.

5.1 Alternate Route 1

Alternate Route 1 replaces the Base Route alignment from the I-295 T-Line and Point Meadows Drive substation to the Greenland WTP connection point. Most of this alternate route occurs on the east side of I-295, from Gate Parkway to just south of E-Town Parkway within a proposed 150-foot easement that JEA is negotiating. The final easement alignment is not known at this time and may potentially change the quantities and installation method discussed below. Alternate Route 1 is shown on Figures GL-Alt 1-1 through GL-Alt 1-58.

As the Base Route continues south on the I-295 T-Line, Alternate Route 1 turns east at Point Meadows Drive and continues east onto Gate Parkway. The alignment along Gate Parkway will require navigating several existing utilities and future/ongoing projects. An FDOT project installing culverts on the south side of Gate Parkway under the I-295 overpass is in progress, requiring careful consideration of the 30-inch raw water main alignment in this location (see Photo 3). In the north right-of-way are several underground electric lines and stormwater conveyance to a large stormwater pond in the northeast quadrant of the interchange, as well as a large IKEA sign in the northwest quadrant. In the south right-of-way is an existing 16-inch water main and underground electric. Because of these constraints in the right-of-way, the optimum alignment is proposed to be in the southern right-of-way along Gate Parkway under I-295.

Photo 3: I-295 Overpass at Gate Parkway

Alternative 1 continues eastward on Gate Parkway after traversing the I-295 mainline and ramps to the current end of the paved section of Gate Parkway. At this point, the pipeline will follow a proposed JEA easement that continues from the end of Gate Parkway until reaching the end of the adjacent northeast corner of the Hampton Park neighborhood. The pipe continues along the east side of the Hampton Park neighborhood southward to the east of the Sweetwater neighborhood and Atlantic Coast High School. The 30-inch pipe alignment stays parallel to I-295 within the 150-foot easement to the future Greenland WRF site. The pipe alignment on the WRF site and access road will need to be coordinated with the ongoing WRF and pipeline design. At this time, the SIPS pipeline alignment is anticipated to parallel the WRF property line to the north and northwest of the WRF site, where it will ultimately turn west and cross Big Davis Creek and State Road 9B, and then enter the GEC/Greenland WTP site.

5.1.1 Trenchless Crossings

Three auger bores are proposed at the I-295/Gate Parkway interchange. The three auger bores traverse the southbound on-ramp, elevated I-295 mainline, and the northbound off-ramp. It should be noted that final alignment determinations may affect proposed auger bore locations. These auger bores will require a FDOT utility permit. From Gate Parkway and Baymeadows to the connection point at the Greenland WTP, it is assumed that there will be six proposed HDDs to traverse wetland areas (including Pablo Creek and Big Davis Creek) and one proposed HDD crossing of Big Davis Creek and State Road 9B just south of the E-Town Parkway exit.

5.1.2 Summary

Critical components that differentiate the Alternate Route 1 from the Base Route include total pipeline length, assessment of maintenance of traffic (MOT), permitting, easements, and local community impacts. The Base Route will be used as a base cost for comparative purposes to the alternate routes provided herein. Alternate Route 1 provides the following characteristics:

- 41,028 LF of 30-inch pipe replacing 31,070 LF of 30-inch pipe on the Base Route.
- Open cut along Point Meadows Road and Gate Parkway.
- Three Auger Bore Crossings identified, totaling 550 LF at the Gate Parkway and I-295 interchange.
- Seven HDDs identified, totaling 12,780 LF (Six wetland crossings and one State Road 9B crossing), replacing 5,675 LF on the Base Route.
- Significant tree clearing is anticipated along the easement portions of this Alternative Route.
- A lengthy permanent easement is currently being negotiated by JEA to potentially accommodate this pipeline, as well as a wastewater force main, a reclaimed water main and a future T-Line.

5.2 Alternate Route 2

Alternate Route 2 replaces the section of the Base Route that goes around the west side of electric substation at the I-295 T-Line and Point Meadows Drive. This route instead uses Point Meadows Drive to avoid the substation area and the extensive underground electric lines, vaults and structures in that area. Alternate Route 2 is shown on Figures GL-Alt 2-1 through GL-Alt 2-2.

Instead of going around west of the substation, Alternate Route 2 goes to the east of the substation, an adjacent physician's office, and a stormwater pond. The property adjacent to the physician's office to the north is currently under development, including a new stormwater pond. Using the southbound lane of Point Meadows Drive (see Photo 4), the alignment continues south past an existing stormwater pond to the substation service road, where the alignment turns west and meets back up with the Base Route in the T-Line.

Photo 4: Southbound lane of Point Meadows Drive with physician's office and pond to the west.

Alternate Route 2 requires less tree clearing and dewatering than going around the west side of the substation on the Base Route. Additionally, the eastern route avoids altogether the underground electric infrastructure surrounding the substation. Open cut construction on Point Meadows Drive will require pavement repair and a temporary traffic control plan, including flagger operation to maintain two-way access to the physician's office and on Point Meadows Drive.

5.2.1 Summary

Critical components that differentiate the Alternate Route 2 from the Base Route include total pipeline length, assessment of maintenance of traffic (MOT), permitting, easements, and local community impacts as they relate to the routing of the pipeline around the Point Meadows Substation to the east versus traversing the property to the west (as in the Base Route). Alternate Route 2 provides the following characteristics:

- 1,436 LF of 30-inch pipe replacing 1,220 LF of 30-inch pipe on the Base Route.
- No trenchless crossings are identified for this alternate route; however, this alternate route includes open cut along Point Meadows Road.
- Although it avoids open cut and dewatering construction along the west side of the substation, this alternative requires pavement repair and a temporary traffic control plan.
- Tree clearing along substation driveway will be required.
- This alignment will likely require easement acquisition.

- Potential wetland impacts by the substation driveway are possible.

5.3 Alternate Route 3A

Alternate Route 3A uses the Validus Road corridor and Burnt Mill Road to connect the proposed pipeline from the north-south Deerwood T-Line to the I-295 T-Line south of J Turner Butler Blvd. Alternate Route 3A avoids congested construction within the east-west Town Center T-line and minimizes construction in the critical I-295 T-line. Alternate Route 3A is shown on Figures GL-Alt 3A-1 through GL-Alt 3A-11.

Exiting the north-south Deerwood T-Line near the Validus Road corridor, Alternate Route 3A follows the Validus Road corridor to Burnt Mill Road and continues southeast in the eastbound lane. At Validus Road and Burnt Mill Road, there are several wet utilities the pipe alignment will need to navigate. As shown on Figure GL-Alt 3A-4 using the most current JEA GIS information, in less than 500 LF there are approximately five force main crossings, one water main crossing, several underground electric crossings, and one stormwater pipe crossing.

5.3.1 Summary

Critical components that differentiate the Alternate Route 3A from the Base Route include total pipeline length, assessment of maintenance of traffic (MOT), permitting, easements, and local community impacts. The Base Route will be used as a base cost for comparative purposes to the alternate routes provided herein; however, should Forest Blvd be chosen in the Deerwood Route, Alternate Route 3A may become part of the base for Greenland. Alternate Route 3A provides the following characteristics:

- 8,496 LF of 30-inch pipe.
- This alternate route includes open cut crossing of Validus Road and open cut along Burnt Mill Road.
- There are no anticipated trenchless crossings identified for this alternate route.
- Alternate 3A avoids placing the 30-inch raw water main in an already crowded east-west Town Center T-Line and eliminates the HDD crossing of Brightman Blvd/Town Center Pkwy intersection.
- Pavement repair and temporary traffic control plans will be required for this alternative route.
- Some tree clearing may be required along the Validus Road corridor, depending on the final alignment.
- One or more easements may be required along the Validus Road corridor, depending on the final alignment.

5.4 Alternate Route 3B

Alternate Route 3B is similar to Alternate Route 3A along the Validus Road corridor, but then turns north on Burnt Mill Road to Gate Parkway to connect the proposed pipeline from the Deerwood north-south T-Line to the I-295 T-Line south of J Turner Butler Blvd. Similar to Alternate Route 3A, Alternate Route 3B avoids congested construction within the east-west Town Center T-line and minimizes construction in the critical I-295 T-line. Alternate Route 3B is shown on Figures GL-Alt 3B-1 through GL-Alt 3B-14.

The route mimics Alternate Route 3A along the Validus Road corridor east to Burnt Mill Road, where the pipe alignment turns northeast along Burnt Mill Road and then continues east along Gate Parkway. There is an existing JEA project currently at 90% design to put a reclaimed water main in the north lane of Gate Parkway. The proposed 30-inch raw water main would parallel this reclaimed water main while maintaining the required separation between the two utilities. If these two projects were constructed together, they would share the cost of MOT, mill and overlay, restoration, erosion control, permitting, and other considerations.

5.4.1 Summary

Critical components that differentiate the Alternate Route 3B from the Base Route include total pipeline length, assessment of maintenance of traffic (MOT), permitting, easements, and local community impacts. The Base Route will be used as a base cost for comparative purposes to the alternate routes provided herein; however, should Forest Blvd be chosen in the Deerwood Route, Alternate Route 3B may become part of the base for Greenland. Alternate Route 3B provides the following characteristics:

- 10,346 LF of 30-inch pipe.
- This alternate route includes open cut crossing of Validus Road and open cut along Burnt Mill Road and Gate Parkway.
- There are no anticipated trenchless crossings identified for this alternate route.
- Alternate 3B avoids placing the 30-inch raw water main in an already crowded east-west Town Center T-Line and eliminates the HDD crossing of Brightman Blvd/Town Center Pkwy intersection.
- Pavement repair, temporary traffic control, and other costs can be shared with the current reclaimed water main project under design along most of this route.
- Some tree clearing may be required along the Validus Road corridor, depending on the final alignment.
- One or more easements may be required along the Validus Road corridor, depending on the final alignment.

For the purposes of the route study, a high-level comparative construction cost and critical component comparison of the Alternative Routes 3A and 3B has been provided in Table 5-1. Acknowledging that the overall selected route would utilize the Alternative Route 3A segment along Validus Road (between Burnt Mill Road and the Deerwood T-Line) regardless of the overall selection of 3A or 3B, a comparison of Alternative Routes 3A and 3B was prepared using comparative, truncated segments (Validus Drive/Burnt Mill Road Intersection to Burnt Mill Road/Gate Parkway Intersection). That summary is provided in Table 5-1. While cost is a key factor in the route selection, Alternative Route 3A is preferred due to the fact that it avoids significant permitting challenges and impacts related to increased Gate Parkway exposure, while also providing a significant cost savings.

Table 5-1. Summary Comparison Base Route to Alternative Routes 3A and 3B

Critical Component	Alternate Route 3A[a]	Alternate Route 3B
Total Pipeline Length	6,080 LF	8,300 LF
Open-Cut Installation	Predominantly Burnt Mill Road	Burnt Mill Road and Gate Parkway
Community Impact	High residential MOT, Minimal commercial MOT and Minimal school/church impact	Medium residential MOT, High commercial MOT and Minimal school/church impact
Environmental Value/Impact	Comparable to 3B	Comparable to 3A
FDOT/COJ Permitting	COJ for 6,080 LF (one street)	COJ for 8,300 LF (two streets)
Easements/Real Estate	Required Easement(s) along Validus Road to connect Deerwood Route (T-Line) to Greenland is required for both 3A and 3B	Required Easement(s) along Validus Road to connect Deerwood Route (T-Line) to Greenland is required for both 3A and 3B
Construction Cost	$6,000,000	$8,500,000

[a] Alternate Route 3A is the selected option.

6. Cost Estimate

For the purposes of the route study, a high-level construction comparative cost of each alternate route is provided in comparison to the Base Route. For this study, maintaining an equal basis for comparison was imperative, resulting in a comparative analysis of the route options on equal footing. Therefore, the comparative construction costs themselves should not be construed as to represent Jacobs' overall assessment of the actual projected bid cost of the routes. While cost is a factor in the route selection, all of the criteria should be considered in the decision process.

Table 6-1. Summary Comparative Construction Cost Estimates

Route Description	Total Cost
Base Route	$33,700,000
Base Route + Alternate Route 1 [a]	$49,100,000 [b]
Alternate Route 3A + Base Route Segment (T-Line) + Alternate Route 1 + Base Route Segment at Greenland WTP [c]	$49,200,000 [b]

[a] Alternate Route 2 was found to have a negligible cost difference with the comparative Base Route portion.

[b] Opportunity exists within Alternate Route 1 (along the Davis Property Easement) to reduce the cost of installation by negotiating installation along uplands and minimizing HDD installations, as well as cost-sharing for installation of multiple utilities and easement clearing along a pipeline corridor free of utility conflicts. Utilize JEA's final easement negotiation to make any cost adjustments to these estimates, if applicable.

[c] Alternate Route 3A, plus a small section of the Base Route (I-295 T-Line), plus Alternative Route 1, concluding with a small portion of the Base Route (Greenland GEC/WTP) is the preferred pipeline route to connect to the revised Southside Blvd Intertie to Deerwood III WTP Route, which utilizes Forest Blvd, instead of the I-295 T-Line.

Detailed opinion of probable construction cost estimates (Class 5) are provided in Attachment 2 for the three complete cost estimates provided in Table 6-1, as well as each individual alternative segment.

In providing opinions of cost, financial analyses, economic feasibility projections, for the project, Jacobs has no control over cost or price of labor and materials; unknown or latent conditions of existing equipment or structures that may affect operation or maintenance costs; competitive bidding procedures and market conditions; time or quality of performance by operating personnel or third parties; and other economic and operational factors that may materially affect the ultimate project cost or schedule. Therefore, Jacobs makes no warranty that JEA's actual project costs, financial aspects, economic feasibility, will not vary from Jacobs' opinions, analyses, projections, or estimates.

The SIPS Route Study Cost Estimates are provided for comparison between Base and Alternate Routes. As such, these estimates represent the current estimate of each route and do not include escalation.

The purpose of the cost estimates is to define the comparative construction costs of the various route alternatives. Since the purpose is not to set the initial capital budget, JEA Costs & Engineering (Project Management, Cost & Scheduling, General & Administrative, Permitting, Engineering and Services During Construction) have not been included in these cost estimates.

7. Project Delivery Approach

As part of the final route study, a project delivery approach will be conducted to assess the design and construction delivery approaches available and best-suited to the selected route. This analysis will assess the entire route as well as individual segments (i.e. trenchless sections) to determine the most effective way to bundle and deliver the entirety of this lengthy pipeline route.

A brief review of the project approach by JEA to deliver capital projects historically includes:

- Design-Bid-Build (DBB)

- Construction Manager At-Risk (CMAR)
- Fixed Price (Lump Sum) Design-Build (FPDB)
- Progressive Design-Build (PDB)

A commonly held truth in design and construction is that the ability to impact cost occurs early in the design process. This is maximized if the involvement by the owner, engineer and contractor occurs as early as the pre-design through the design development stage. In traditional DBB, this input does not occur until the construction documents have been prepared and advertised for bid. Therefore, where conditions accommodate, utilizing a project delivery approach that allows collaboration early in the design process (typically a design-build delivery) allows for the opportunity to proactively identify and resolve potential constructability issues, while also identifying ways to maximize the schedule and minimize costs.

A brief comparison of each non-traditional delivery method is provided below:

- CMAR: Two Contracts (Designer-Owner & Contractor-Owner) – Typically engaged at 30% Design for maximum effectiveness. Two-phased – 1) Preconstruction typically design to 60% and development of guaranteed maximum price (GMP) and 2) Construction whereby design is finalized to 100% and project is constructed for the agreed-upon GMP.
- FPDB: One Contract (DB Entity-Owner) – Engaged team at outset to design and build project at a fixed price based on a conceptual design provided by the Owner. The single contract is either directly between the Owner and Contractor, Engineer or Integrated Firm.
- PDB: One Contract (DB Entity-Owner) – While the contracting is similar to DB, the delivery is two-phased similar to CMAR; whereby, the Owner works with the DB Entity to develop a 60% design. Then, following the negotiation of a GMP, the project proceeds to 100% design and construction.

There are other non-traditional delivery methods that are utilized in the industry, including Design-Build-Operate (DBO), Public-Private-Partnership (P3) and Program Manager at Risk (PMAR); however, only PMAR will be explored in this section as an applicable option for the SIPS Subprogram. PMAR is a variation of the aforementioned non-traditional delivery methods whereby there is one contract with the Program Manager (housing both the design and construction entities) and the delivery may be through fixed-price, negotiated GMP and/or open book. PMAR provides flexibility to the Owner when there are many projects and/or a large project with many defined segments/scopes of work and the Program Manager is best-suited to manage the large number of procurements (i.e. design, construction, materials, etc.).

One of the key aspects to the project delivery approach is to apportion and manage the project risk, ensuring that the appropriate risk is placed on the appropriate party. Risk allocation, when optimized, will lead to the optimum quality, cost and schedule delivery of a project.

Upon confirmation of the selected pipeline routing, the recommended project delivery approach will be developed to support efficient and cost-effective design and construction. Utilizing the techniques and concepts developed in this section will support the following key aspects: assigning a single point of responsibility; improving schedule completion date; increasing participation from local and preferred vendors; delivering value through timely assessment of ideas and identifying cost effective solutions.

8. Evaluation Criteria

This section provides a summary of evaluation criteria used in this route study. The evaluation criteria used to rank and select the final route for the Deerwood III WTP to the Greenland WTP should be reflective of JEA's Corporate Measures, which are guided by and evaluated against four measures:

- Customer Value – What a customer expects to get in exchange for the price.,
- Financial Value – The monetary value and risk profile, both today and tomorrow, of JEA as it relates to the City.

- Community Impact Value – Improving the quality of life through innovative and cost-effective service offerings, employee volunteerism and ambassadorship, relevant and timely communications, and support of economic development and job growth throughout JEA's service territory; fostering a collaborative and respectful corporate culture that provides exceptional employee value to equip the JEA team to deliver outstanding service and value to our community.
- Environmental Value – Ensuring a sustainable environment for future generations.

8.1 Overall Cost Consideration

The investment to install this new infrastructure must be measured foremost on the price that JEA will be required to pay to install the SIPS Deerwood III WTP to the Greenland WTP pipeline. The weighting and value of this criteria in the entire route consideration must be determined by JEA to be given the appropriate weighted factor.

8.2 Traffic Disruption/Trenchless Crossings

The final route selected will contain auger bores and HDDs. Proposed trenchless crossings of larger and/or heavily trafficked roads (JTB and I-295) are recommended to reduce impacts to the public during construction. The actual trenchless method should be confirmed in the design phase through geotechnical investigation and evaluation of subsurface conditions, corrosion properties, existing utility locations, easement and property, and other factors. Applicable geotechnical instrumentation, such as settlement monitoring points and piezometer locations and details should be developed during the design phase. Auger bore crossings for 30-inch raw water main are anticipated to have 48-inch diameter steel casing installed at least two casing diameters deep. The use of auger bore crossings will minimize the impact to traffic in the vicinity of these crossings.

8.3 Environmental Impact/Horizontal Directional Drills

Several HDDs are being considered along the Base Route and Alternate Route 1 described herein. The intent of the HDD is to minimize disruption and impact to environmentally sensitive areas. Overall, there are several significant HDD crossings in the Base Route and Alternate Route 1, including large wetland crossings, creeks, and ponds.

8.4 Tree Impacts

Along the Base Route and Alternate Routes 2, 3A, and 3B, there are minimal tree impacts because these routes occur either in cleared right-of-way and T-Lines, or within road pavement. The largest impact to trees will be along Alternate Route 1, where clearing will be needed along the proposed easement corridor. Until a tree survey can be done in the design phase, no large trees of concern have been identified for these routes.

8.5 Neighborhood/Residential Impacts

The Base Route and alternate routes for Deerwood III WTP to Greenland WTP do not directly impact any neighborhoods.

8.6 Maintenance of Traffic

The largest impact to traffic for the Base Route will be at the single open cut crossing at Burnt Mill Road. Alternate Route 1 will require temporary traffic control for the limited portion of the route that occupies Gate Parkway. Alternate Routes 2, 3A, and 3B are within traffic lanes along Point Meadows Drive, Burnt Mill Road, and Gate Parkway, respectively, and will require a temporary traffic control plan for the lane closures.

8.7 Permitting Requirements and Challenges

Permitting through the Florida Department of Environmental Protection (FDEP), FDOT, and COJ are required regardless of the selected route. The permitting requirements for all routes under consideration are anticipated to be similar and as such do not provide differentiation between route options.

8.8 Real Estate Impacts/Easements

Only permanent easements were considered for this evaluation. Temporary construction easements were not quantified but are expected and may be needed at trenchless crossings for both the Base Route and Alternate Route 1. Extents of temporary construction easements will be determined during the design phase. Known permanent easement requirements for each route are identified in Table 7-1.

Table 8-1. Expected Permanent Easements for Each Route Evaluated

Route	Expected Easements
Base Route	Two small easements on the north side of the Point Meadows Substation, and a long easement under the Private Property within T-Line between Point Meadows Substation and Old Still Road.
Alternate Route 1	North of physician's office parking lot between T-Line and Point Meadows Drive. Additionally, multiple locations parallel to I-295 for the length of the route from the paved end of Gate Parkway to the Greenland WRF (currently under negotiation) and continuing to the GEC/Greenland WTP.
Alternate Route 2	North of physician's office parking lot between T-Line and Point Meadows Drive. Additionally, an easement south of the substation driveway may be required.
Alternate Route 3A	Easement required along Validus Road to connect to Deerwood Pipeline along T-Line
Alternate Route 3B	Easement required along Validus Road (1st segment of 3A would be needed to connect to the Southside to Deerwood III WTP pipeline)

8.9 Hazard/Contamination Areas

Using FDEP's Contamination Locator Map (CLM), two active petroleum cleanup sites occur within 500 feet of the proposed Base Route. The first site is at the Shell Gas Station at the I-295 T-Line and Baymeadows Road. The second contamination site is located on the T.G. Lee Dairy property just northwest of the GEC/Greenland WTP and west of the T-Line. There are no contamination sites identified within 500 feet for Alternate Routes 1, 2, 3A, or 3B.

9. Conclusion and Recommendations

Following review of the Draft Route Study (delivered to JEA on Monday, September 30, 2019), a Route Study Review Workshop was conducted on Thursday, October 10, 2019. Through detailed discussion and analysis, JEA concluded that *the selected route for the Deerwood III WTP to Greenland WTP SIPS Pipeline Route involved utilizing Alternative Route 3A (Validus Drive/Burnt Mill Road) at the outset to connect to the Deerwood pipeline along the Deerwood T-Line, followed by the Base Route (along the I-295 T-Line) until reaching Alternative Route 1 (north side of the Point Meadows Substation), where the route utilizes Alternative Route 1 (Easement north of Point Meadows Substation to Point Meadows Drive, then Gate Parkway all the way to the Davis Easement) through the Greenland Water Reclamation Facility then under State Road 9B to the Greenland Energy Center, where it will reconnect with the Base Route concluding with an intertie at the Greenland WTP.*

For the purposes of summarizing this comparison and the confirmation of the Selected Route, a high-level comparative route summary has been provided below in Table 9-1. While each of the factors presented in Table 9-1 are important in the route selection process, many additional considerations led to the Selected Route, as described below Table 9-1. Additionally, the Final Selected Route is also

represented in Figure GL-Selected in Attachment 1, as well as with a detailed Selected Route Cost Estimate in Attachment 2 and more detailed GIS Figures in Attachment 4.

Table 9-1. Summary Comparison of Route Alternatives

Critical Component	Base Route	Base Route +Alt 1	Selected Route
Total Pipeline Length	43,220 LF	53,180 LF	52,240 LF
Trenchless Auger Bore Crossings	Two @ 435 LF Total (Gate & Baymeadows)	Four @ 700 LF Total (Gate and I-295)	Three @ 550 LF Total (I-295)
Trenchless HDD Installations	Four @ 6,855 LF Total (JTB, I-295 and T-Line Wetlands)	Eight @ 13,960 LF Total (JTB, SR 9B and T-Line Wetlands) [a]	Seven @ 12,780 LF Total (SR 9B and T-Line Wetlands) [a]
Community Impact	Residential MOT (Low) Commercial MOT (Low) Minimal School/Church	Residential MOT (Medium) Commercial MOT (Medium) Minimal School/Church	Residential MOT (Medium) Commercial MOT (Medium) Minimal School/Church
Community Value	New Paved Roads (N/A) Replace Old Pipe (N/A) Accommodate Future Expansion (Low)	New Paved Roads (Low) Replace Old Pipes (N/A) Accommodate Future Expansion (High)	New Paved Roads (Medium) Replace Old Pipes (N/A) Accommodate Future Expansion (High)
Environmental Impact	HDD Wetland Crossings Minimal Tree Impact No Known Contamination Gopher Tortoise (Med)	HDD Wetland Crossings Maximum Tree Impact (Esmt) No Known Contamination Gopher Tortoise (Med)	HDD Wetland Crossings Maximum Tree Impact (Esmt) No Known Contamination Gopher Tortoise (Med)
Permitting (FDOT & COJ)	FDOT (3) – Baymeadows, JTB & I-295 crossings COJ (3) – Over 500 LF	FDOT (3) – JTB, I-295 & SR-9B COJ (3) – Over 4,000 LF	FDOT (2) – JTB & SR-9B COJ (3) – Over 9,000 LF
Easements/Real Est.	Two (Est. 2 acres)	Two (Est. 20+ acres)	Three (Est. 20+ acres)
Construction Cost	**$33,700,000**	**$49,100,000** [b]	**$49,200,000** [b]

[a] Opportunity exists within Alternate Route 1 (along the Davis Property Easement) to reduce the cost of installation by negotiating installation along uplands and minimizing HDD installations.

[b] Additional opportunities to minimize cost exist for the routes utilizing Alternative Route 1 including: cost-sharing for installation of multiple utilities in the same easement, easement clearing along a pipeline corridor (shared cost with electric), and installation predominantly free of utility conflicts (green field) yielding lower construction cost bids. Utilize JEA's final easement negotiation to make any cost adjustments to these estimates, if applicable, thus lowering the cost of these options.

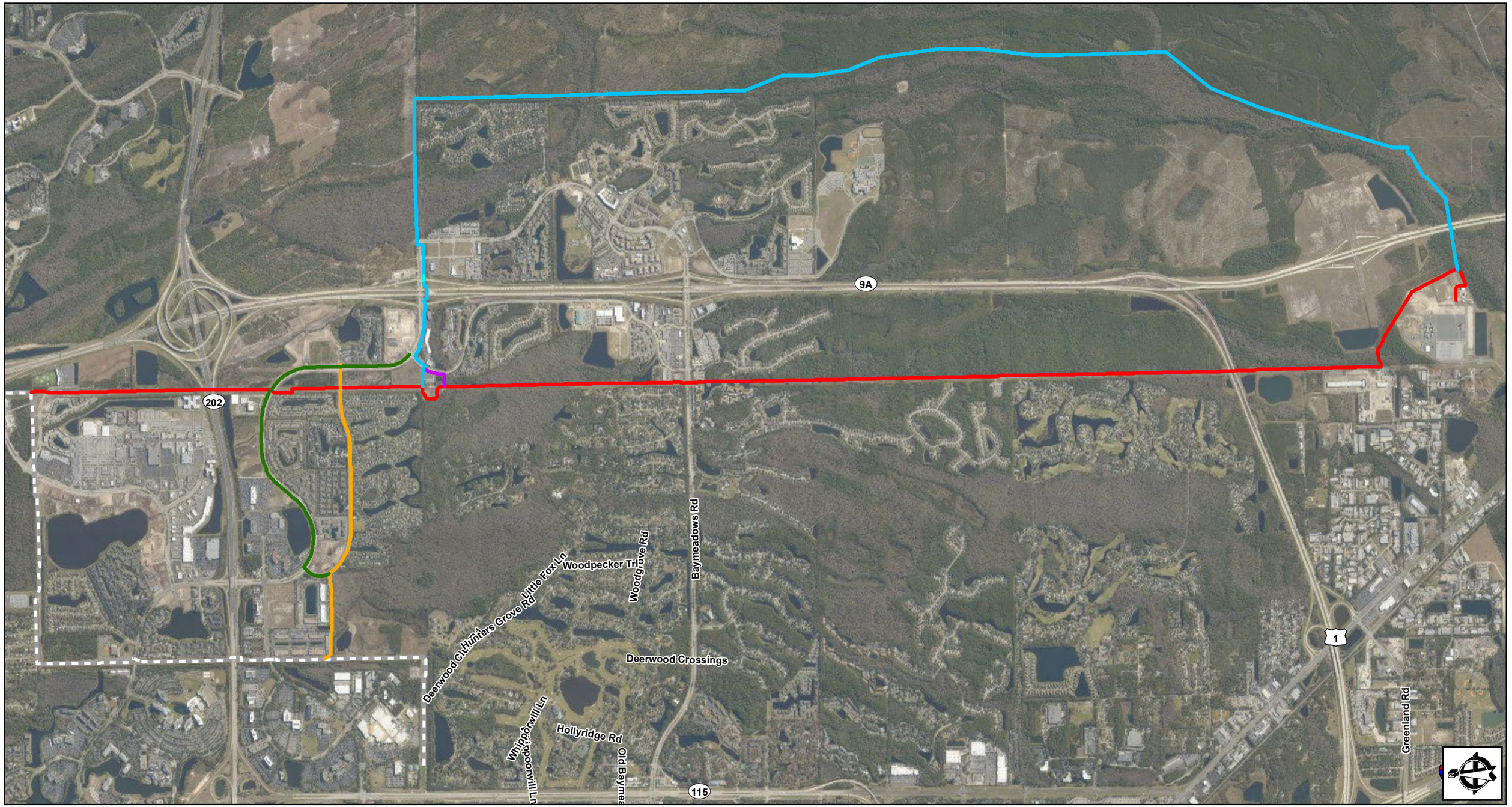
In conjunction with the summary listed in Table 12-1, JEA reviewed future system requirements/needs and selected the route (Selected Route) utilizing the Alternative Route 3A connection to the Deerwood T-Line and Alternative Route 1 (Davis Easement). While cost is a factor in the route selection, many additional considerations led to the Selected Route. This alignment provides a significant improvement in location for JEA to better support long-term planning. Specifically:

- Proximity to major future development area will enable draw and fill water plants to serve the new development area. Draw and fill plant(s) will serve distribution pipe network that will be interconnected through the eTown and Wells Creek developments which will benefit the JEA South Grid.

- Proximity to future water supply (Purified Water at UNF and/or Greenland WRF sites).

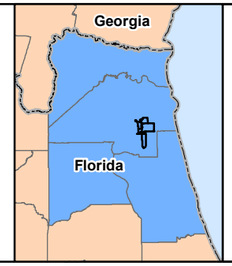
The Final Selected Route is represented in Figure GL-Selected in Attachment 1, as well as with a detailed Selected Route Cost Estimate in Attachment 2 and more detailed GIS Figures in Attachment 4.

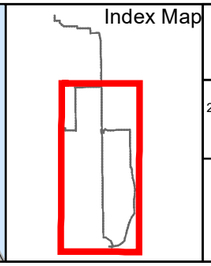
Attachment 1
Greenland Overview and
Final Selected Route Overview – Figures



Legend

- Greenland Base Route
- Greenland Alternative 1
- Greenland Alternative 2
- Greenland Alternative 3A
- Greenland Alternative 3B
- Deerwood Base Route





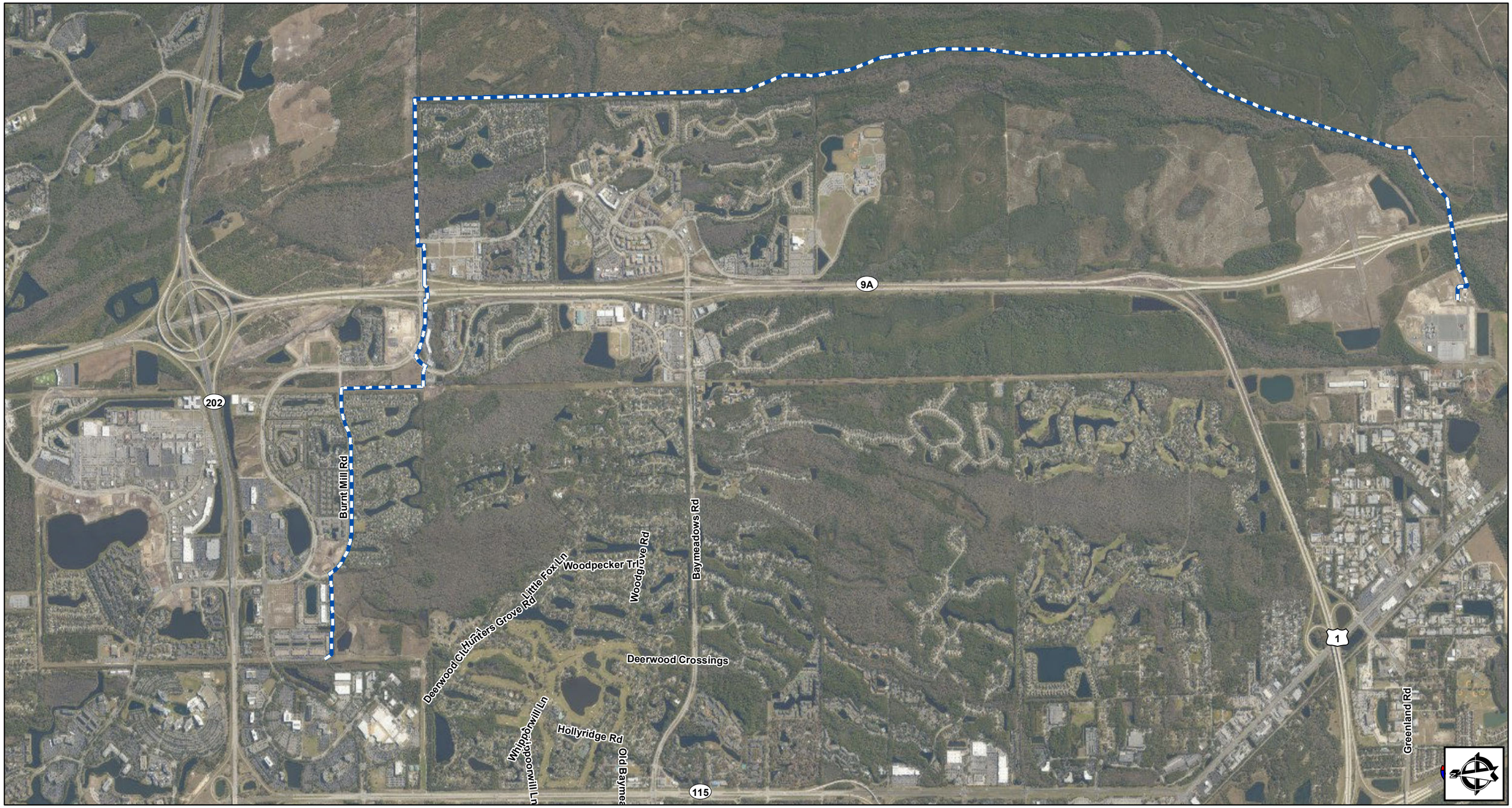
Greenland Overview

2,500 1,250 0 2,500 Feet

Figure GL-OV

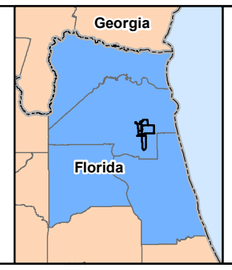
JACOBS

JEA sm Building Community sm

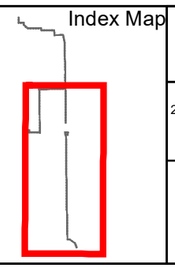


Legend

Greenland Selected Route



Index Map



Final Selected Route
Deerwood III WTP to Greenland WTP

2,500 1,250 0 2,500 Feet

Figure GL-Selected

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Attachment 2
Cost Estimates – Tables

JEA-SIPS-Deerwood III to Greenland Route Study **Base Route**

Opinion of Probable Construction Cost - CLASS 5 **December 19, 2019**

*Unless otherwise noted, this column refers to paragraphs /sections found in the latest edition of the JEA's Water & Sewer Standards Manual.
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**Reference found in this solicitation.
***Refer to XXX-17 Appendix A Technical Specifications.

Item No.	Spec No.	Est. Qty.	Unit	Description	Unit Price	Total Price
1	801.VIII	167,518	SY	Grassing/Seeding	$2.75	$460,673.89
2		3,080	SY	Tree Clearing	$2.25	$6,930.00
3	801.IX.1	704	SY	Pavement Removal (COJ)	$12.50	$8,795.14
4	801.IX.2	704	SY	Paving Repair - Cross Cuts and Patches - Asphalt (COJ Case X)	$50.75	$35,708.26
5	801.IX.2	621	SY	Paving Repair - Cross Cuts and Patches - Base (COJ Case X)	$22.50	$13,968.75
6	801.X.5	244	SY	Replace Driveway (Gravel Access Road)	$14.00	$3,422.22
7	801.IX.6	2,678	SY	Existing Pavement - Milling & Resurfacing (COJ)	$23.50	$62,927.78
8	801.X.1	89	SY	Remove Concrete Sidewalk (COJ)	$25.00	$2,222.22
9	801.X.3	160	LF	Remove Curb and Gutter (COJ)	$15.00	$2,400.00
10	801.X.4	89	SY	Replace Concrete Sidewalk (COJ)	$85.00	$7,555.56
11	801.X.6	160	LF	Replace Curb and Gutter (COJ)	$35.00	$5,600.00
12	801.X.5	0	SY	Remove Unpaved Driveway	$5.00	$0.00
13	801.X.5	0	SY	Replace Unpaved Driveway	$10.00	$0.00
14	801.X.5	0	SY	Remove Concrete Driveway	$25.00	$0.00
15	801.X.5	0	SY	Replace Concrete Driveway Crossings	$45.00	$0.00
16	801.X.5	0	SY	Remove Asphalt Driveway Crossings	$12.50	$0.00
17	801.X.5	0	SY	Replace Asphalt Driveway Crossings	$65.00	$0.00
18	801.X.5	0	SY	Remove Ornamental Brick Driveway Crossings	$35.00	$0.00
19	801.X.5	0	SY	Replace Ornamental Brick Driveway Crossings	$50.00	$0.00
20		24	EA	Type B Crossings (4 - 30" 45° pipe fittings at each crossing)	$21,500.00	$516,000.00
21	801.XVII.1	17,965	LF	30" CLDI (PC150) Pipe Push-on (WM) - by open cut	$280.00	$5,030,200.00
22	801.XVII.1	17,965	LF	30" CLDI (PC150) Pipe, RJ (WM) - by open cut	$360.00	$6,467,400.00
23	801.XVII.3	1	EA	30" MJ Sleeve	$3,650.00	$3,650.00
24	801.XVII.3	36	EA	30" 45° MJ Bend, RJ	$3,900.00	$140,400.00
25	801.XVII.3	10	EA	30" 22.5° MJ Bend, RJ	$3,650.00	$36,500.00
26	801.XVII.3	11	EA	30" 11.25° MJ Bend, RJ	$3,650.00	$40,150.00
27	801.XVIII.1	23	EA	30" MJ Gate Valve	$48,320.00	$1,111,360.00
28	801.XVIII.4	50	EA	Manual Air Release Valve (MARV)	$3,750.00	$187,500.00
29	801.XXIV.1	6,855	LF	36" HDPE DR 11 DIPS Pipe by HDD	$1,050.00	$7,197,750.00
30	801.XXIV.1	435	LF	30" CLDI (PC150) Pipe, RJ (WM) - by Auger bore	$250.00	$108,750.00
31	801.XXIV.1	435	LF	48" Steel Casing - by Auger bore	$4,500.00	$1,957,500.00
				Cash Allowances		
32	801.XVII.1	1	LS	Testing Allowance		$0.00
33		1	LS	Law Enforcement Allowance		$0.00

SUBTOTAL (Includes Cash Allowance)		**$23,500,000.00**
GENERAL/SPECIAL CONDITIONS (MAX. 10% OF SUBTOTAL)	10%	**$2,400,000.00**
TOTAL (Subtotal plus General Conditions & Special Conditions)		**$25,900,000.00**
Contigency	30%	**$7,800,000.00**
TOTAL CONSTUCTION COST		**$33,700,000.00**

Note: 1. In providing opinions of cost, financial analyses, economic feasibility projections, for the project, Jacobs has no control over cost or price of labor and materials; unknown or latent conditions of existing equipment or structures that may affect operation or maintenance costs; competitive bidding procedures and market conditions; time or quality of performance by operating personnel or third parties; and other economic and operational factors that may materially affect the ultimate project cost or schedule. Therefore, Jacobs makes no warranty that JEA's actual project costs, financial aspects, economic feasibility, will not vary from Jacobs' opinions, analyses, projections, or estimates.
2. The SIPS Route Study Cost Estimates are provided for comparison between Base and Alternate Routes. As such, these estimates represent the current estimate of each route and do not include escalation.
3. The purpose of cost estimates are to define the comparative construction costs of the various route alternatives. Since the purpose is not to set the initial capital budget, JEA Costs & Engineering (Project Management, Cost & Scheduling, General & Administrative, Permitting, Engineering and Services During Construction) have not been included in these cost estimates.

JEA-SIPS-Deerwood III to Greenland Route Study **Base Route with Alternate 1**

Opinion of Probable Construction Cost - CLASS 5 **December 19, 2019**

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Item No.	Spec No.	Est. Qty.	Unit	Description	Unit Price	Total Price
1	801.VIII	111,149	SY	Grassing/Seeding	$2.75	$305,658.77
2		52,919	SY	Tree Clearing	$2.25	$119,067.03
3	801.IX.1	1,776	SY	Pavement Removal (COJ)	$12.50	$22,194.44
4	801.IX.2	1,776	SY	Paving Repair - Cross Cuts and Patches - Asphalt (COJ Case X)	$50.75	$90,109.44
5	801.IX.2	1,567	SY	Paving Repair - Cross Cuts and Patches - Base (COJ Case X)	$22.50	$35,250.00
6	801.X.5	22	SY	Replace Driveway (Gravel Access Road)	$14.00	$311.11
7	801.IX.6	12,232	SY	Existing Pavement - Milling & Resurfacing (COJ)	$23.50	$287,449.39
8	801.X.1	144	SY	Remove Concrete Sidewalk (COJ)	$25.00	$3,611.11
9	801.X.3	891	LF	Remove Curb and Gutter (COJ)	$15.00	$13,365.00
10	801.X.4	144	SY	Replace Concrete Sidewalk (COJ)	$85.00	$12,277.78
11	801.X.6	891	LF	Replace Curb and Gutter (COJ)	$35.00	$31,185.00
12	801.X.5	144	SY	Remove Unpaved Driveway	$5.00	$722.22
13	801.X.5	144	SY	Replace Unpaved Driveway	$10.00	$1,444.44
14	801.X.5	0	SY	Remove Concrete Driveway	$25.00	$0.00
15	801.X.5	0	SY	Replace Concrete Driveway Crossings	$45.00	$0.00
16	801.X.5	0	SY	Remove Asphalt Driveway Crossings	$12.50	$0.00
17	801.X.5	0	SY	Replace Asphalt Driveway Crossings	$65.00	$0.00
18	801.X.5	0	SY	Remove Ornamental Brick Driveway Crossings	$35.00	$0.00
19	801.X.5	0	SY	Replace Ornamental Brick Driveway Crossings	$50.00	$0.00
20		36	EA	Type B Crossings (4 - 30" 45° pipe fittings at each crossing)	$21,500.00	$774,000.00
21	801.XVII.1	19,259	LF	30" CLDI (PC150) Pipe Push-on (WM) - by open cut	$280.00	$5,392,520.00
22	801.XVII.1	19,259	LF	30" CLDI (PC150) Pipe, RJ (WM) - by open cut	$360.00	$6,933,240.00
23	801.XVII.3	2	EA	30" MJ Sleeve	$3,650.00	$7,300.00
24	801.XVII.3	41	EA	30" 45° MJ Bend, RJ	$3,900.00	$159,900.00
25	801.XVII.3	12	EA	30" 22.5° MJ Bend, RJ	$3,650.00	$43,800.00
26	801.XVII.3	13	EA	30" 11.25° MJ Bend, RJ	$3,650.00	$47,450.00
27	801.XVIII.1	35	EA	30" MJ Gate Valve	$48,320.00	$1,691,200.00
28	801.XVIII.4	62	EA	Manual Air Release Valve (MARV)	$3,750.00	$232,500.00
29	801.XXIV.1	13,960	LF	36" HDPE DR 11 DIPS Pipe by HDD	$1,050.00	$14,658,000.00
30	801.XXIV.1	700	LF	30" CLDI (PC150) Pipe, RJ (WM) - by Auger bore	$250.00	$175,000.00
31	801.XXIV.1	700	LF	48" Steel Casing - by Auger bore	$4,500.00	$3,150,000.00
				Cash Allowances		
32	801.XVII.1	1	LS	Testing Allowance		$0.00
33		1	LS	Law Enforcement Allowance		$0.00

SUBTOTAL (Includes Contingency and Cash Allowance)		**$34,200,000.00**
GENERAL/SPECIAL CONDITIONS (MAX. 10% OF SUBTOTAL)	10%	**$3,500,000.00**
TOTAL (Subtotal plus General Conditions & Special Conditions)		**$37,700,000.00**
Contigency	30%	**$11,400,000.00**
TOTAL CONSTUCTION COST		**$49,100,000.00**

Note: 1. In providing opinions of cost, financial analyses, economic feasibility projections, for the project, Jacobs has no control over cost or price of labor and materials; unknown or latent conditions of existing equipment or structures that may affect operation or maintenance costs; competitive bidding procedures and market conditions; time or quality of performance by operating personnel or third parties; and other economic and operational factors that may materially affect the ultimate project cost or schedule. Therefore, Jacobs makes no warranty that JEA's actual project costs, financial aspects, economic feasibility, will not vary from Jacobs' opinions, analyses, projections, or estimates.
2. The SIPS Route Study Cost Estimates are provided for comparison between Base and Alternate Routes. As such, these estimates represent the current estimate of each route and do not include escalation.
3. The purpose of cost estimates are to define the comparative construction costs of the various route alternatives. Since the purpose is not to set the initial capital budget, JEA Costs & Engineering (Project Management, Cost & Scheduling, General & Administrative, Permitting, Engineering and Services During Construction) have not been included in these cost estimates.

JEA-SIPS-Deerwood III to Greenland Route Study **Base Route with Alternate 2**

Opinion of Probable Construction Cost - CLASS 5 **December 19, 2019**

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Item No.	Spec No.	Est. Qty.	Unit	Description	Unit Price	Total Price
1	801.VIII	163,984	SY	Grassing/Seeding	$2.75	$450,955.24
2		3,080	SY	Tree Clearing	$2.25	$6,930.00
3	801.IX.1	945	SY	Pavement Removal (COJ)	$12.50	$11,817.36
4	801.IX.2	945	SY	Paving Repair - Cross Cuts and Patches - Asphalt (COJ Case X)	$50.75	$47,978.49
5	801.IX.2	834	SY	Paving Repair - Cross Cuts and Patches - Base (COJ Case X)	$22.50	$18,768.75
6	801.X.5	1,156	SY	Replace Driveway (Gravel Access Road)	$14.00	$16,177.78
7	801.IX.6	4,869	SY	Existing Pavement - Milling & Resurfacing (COJ)	$23.50	$114,418.89
8	801.X.1	289	SY	Remove Concrete Sidewalk (COJ)	$25.00	$7,222.22
9	801.X.3	755	LF	Remove Curb and Gutter (COJ)	$15.00	$11,325.00
10	801.X.4	289	SY	Replace Concrete Sidewalk (COJ)	$85.00	$24,555.56
11	801.X.6	755	LF	Replace Curb and Gutter (COJ)	$35.00	$26,425.00
12	801.X.5	0	SY	Remove Unpaved Driveway	$5.00	$0.00
13	801.X.5	0	SY	Replace Unpaved Driveway	$10.00	$0.00
14	801.X.5	0	SY	Remove Concrete Driveway	$25.00	$0.00
15	801.X.5	0	SY	Replace Concrete Driveway Crossings	$45.00	$0.00
16	801.X.5	0	SY	Remove Asphalt Driveway Crossings	$12.50	$0.00
17	801.X.5	0	SY	Replace Asphalt Driveway Crossings	$65.00	$0.00
18	801.X.5	0	SY	Remove Ornamental Brick Driveway Crossings	$35.00	$0.00
19	801.X.5	0	SY	Replace Ornamental Brick Driveway Crossings	$50.00	$0.00
20		27	EA	Type B Crossings (4 - 30" 45° pipe fittings at each crossing)	$21,500.00	$580,500.00
21	801.XVII.1	18,073	LF	30" CLDI (PC150) Pipe Push-on (WM) - by open cut	$280.00	$5,060,440.00
22	801.XVII.1	18,073	LF	30" CLDI (PC150) Pipe, RJ (WM) - by open cut	$360.00	$6,506,280.00
23	801.XVII.3	2	EA	30" MJ Sleeve	$3,650.00	$7,300.00
24	801.XVII.3	34	EA	30" 45° MJ Bend, RJ	$3,900.00	$132,600.00
25	801.XVII.3	11	EA	30" 22.5° MJ Bend, RJ	$3,650.00	$40,150.00
26	801.XVII.3	12	EA	30" 11.25° MJ Bend, RJ	$3,650.00	$43,800.00
27	801.XVIII.1	24	EA	30" MJ Gate Valve	$48,320.00	$1,159,680.00
28	801.XVIII.4	53	EA	Manual Air Release Valve (MARV)	$3,750.00	$198,750.00
29	801.XXIV.1	6,855	LF	36" HDPE DR 11 DIPS Pipe by HDD	$1,050.00	$7,197,750.00
30	801.XXIV.1	435	LF	30" CLDI (PC150) Pipe, RJ (WM) - by Auger bore	$250.00	$108,750.00
31	801.XXIV.1	435	LF	48" Steel Casing - by Auger bore	$4,500.00	$1,957,500.00
				Cash Allowances		
32	801.XVII.1	1	LS	Testing Allowance		$0.00
33		1	LS	Law Enforcement Allowance		$0.00

SUBTOTAL (Includes Cash Allowance)		**$23,800,000.00**
GENERAL/SPECIAL CONDITIONS (MAX. 10% OF SUBTOTAL)	10%	**$2,400,000.00**
TOTAL (Subtotal plus General Conditions & Special Conditions)		**$26,200,000.00**
Contigency	30%	**$7,900,000.00**
TOTAL CONSTUCTION COST		**$34,100,000.00**

Note: 1. In providing opinions of cost, financial analyses, economic feasibility projections, for the project, Jacobs has no control over cost or price of labor and materials; unknown or latent conditions of existing equipment or structures that may affect operation or maintenance costs; competitive bidding procedures and market conditions; time or quality of performance by operating personnel or third parties; and other economic and operational factors that may materially affect the ultimate project cost or schedule. Therefore, Jacobs makes no warranty that JEA's actual project costs, financial aspects, economic feasibility, will not vary from Jacobs' opinions, analyses, projections, or estimates.
2. The SIPS Route Study Cost Estimates are provided for comparison between Base and Alternate Routes. As such, these estimates represent the current estimate of each route and do not include escalation.
3. The purpose of cost estimates are to define the comparative construction costs of the various route alternatives. Since the purpose is not to set the initial capital budget, JEA Costs & Engineering (Project Management, Cost & Scheduling, General & Administrative, Permitting, Engineering and Services During Construction) have not been included in these cost estimates.

JEA-SIPS-Deerwood III to Greenland Route Study **Base Route Section 2 - Comparison to Alternate 1**

Opinion of Probable Construction Cost - CLASS 5 **December 19, 2019**

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**Reference found in this solicitation.
***Refer to XXX-17 Appendix A Technical Specifications.

Item No.	Spec No.	Est. Qty.	Unit	Description	Unit Price	Total Price
1	801.VIII	118,604	SY	Grassing/Seeding	$2.75	$326,162.22
2		3,080	SY	Tree Clearing	$2.25	$6,930.00
3	801.IX.1	0	SY	Pavement Removal (COJ)	$12.50	$0.00
4	801.IX.2	0	SY	Paving Repair - Cross Cuts and Patches - Asphalt (COJ Case X)	$50.75	$0.00
5	801.IX.2	0	SY	Paving Repair - Cross Cuts and Patches - Base (COJ Case X)	$22.50	$0.00
6	801.X.5	244	SY	Replace Driveway (Gravel Access Road)	$14.00	$3,422.22
7	801.IX.6	0	SY	Existing Pavement - Milling & Resurfacing (COJ)	$23.50	$0.00
8	801.X.1	0	SY	Remove Concrete Sidewalk (COJ)	$25.00	$0.00
9	801.X.3	0	LF	Remove Curb and Gutter (COJ)	$15.00	$0.00
10	801.X.4	0	SY	Replace Concrete Sidewalk (COJ)	$85.00	$0.00
11	801.X.6	0	LF	Replace Curb and Gutter (COJ)	$35.00	$0.00
12	801.X.5	0	SY	Remove Unpaved Driveway	$5.00	$0.00
13	801.X.5	0	SY	Replace Unpaved Driveway	$10.00	$0.00
14	801.X.5	0	SY	Remove Concrete Driveway	$25.00	$0.00
15	801.X.5	0	SY	Replace Concrete Driveway Crossings	$45.00	$0.00
16	801.X.5	0	SY	Remove Asphalt Driveway Crossings	$12.50	$0.00
17	801.X.5	0	SY	Replace Asphalt Driveway Crossings	$65.00	$0.00
18	801.X.5	0	SY	Remove Ornamental Brick Driveway Crossings	$35.00	$0.00
19	801.X.5	0	SY	Replace Ornamental Brick Driveway Crossings	$50.00	$0.00
20		14	EA	Type B Crossings (4 - 30" 45° pipe fittings at each crossing)	$21,500.00	$301,000.00
21	801.XVII.1	12,555	LF	30" CLDI (PC150) Pipe Push-on (WM) - by open cut	$280.00	$3,515,400.00
22	801.XVII.1	12,555	LF	30" CLDI (PC150) Pipe, RJ (WM) - by open cut	$360.00	$4,519,800.00
23	801.XVII.3	0	EA	30" MJ Sleeve	$3,650.00	$0.00
24	801.XVII.3	19	EA	30" 45° MJ Bend, RJ	$3,900.00	$74,100.00
25	801.XVII.3	7	EA	30" 22.5° MJ Bend, RJ	$3,650.00	$25,550.00
26	801.XVII.3	9	EA	30" 11.25° MJ Bend, RJ	$3,650.00	$32,850.00
27	801.XVIII.1	15	EA	30" MJ Gate Valve	$48,320.00	$724,800.00
28	801.XVIII.4	35	EA	Manual Air Release Valve (MARV)	$3,750.00	$131,250.00
29	801.XXIV.1	5,675	LF	36" HDPE DR 11 DIPS Pipe by HDD	$1,050.00	$5,958,750.00
30	801.XXIV.1	285	LF	30" CLDI (PC150) Pipe, RJ (WM) - by Auger bore	$250.00	$71,250.00
31	801.XXIV.1	285	LF	48" Steel Casing - by Auger bore	$4,500.00	$1,282,500.00
				Cash Allowances		
32	801.XVII.1	1	LS	Testing Allowance		$0.00
33		1	LS	Law Enforcement Allowance		$0.00

SUBTOTAL (Includes Cash Allowance)		**$17,000,000.00**
GENERAL/SPECIAL CONDITIONS (MAX. 10% OF SUBTOTAL)	10%	**$1,700,000.00**
TOTAL (Subtotal plus General Conditions & Special Conditions)		**$18,700,000.00**
Contigency	30%	**$5,700,000.00**
TOTAL CONSTUCTION COST		**$24,400,000.00**

Note: 1. In providing opinions of cost, financial analyses, economic feasibility projections, for the project, Jacobs has no control over cost or price of labor and materials; unknown or latent conditions of existing equipment or structures that may affect operation or maintenance costs; competitive bidding procedures and market conditions; time or quality of performance by operating personnel or third parties; and other economic and operational factors that may materially affect the ultimate project cost or schedule. Therefore, Jacobs makes no warranty that JEA's actual project costs, financial aspects, economic feasibility, will not vary from Jacobs' opinions, analyses, projections, or estimates.
2. The SIPS Route Study Cost Estimates are provided for comparison between Base and Alternate Routes. As such, these estimates represent the current estimate of each route and do not include escalation.
3. The purpose of cost estimates are to define the comparative construction costs of the various route alternatives. Since the purpose is not to set the initial capital budget, JEA Costs & Engineering (Project Management, Cost & Scheduling, General & Administrative, Permitting, Engineering and Services During Construction) have not been included in these cost estimates.

JEA-SIPS-Deerwood III to Greenland Route Study **Base Route Section 3 - Comparison to Alternate 2**

Opinion of Probable Construction Cost - CLASS 5 **December 19, 2019**

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Item No.	Spec No.	Est. Qty.	Unit	Description	Unit Price	Total Price
1	801.VIII	4,889	SY	Grassing/Seeding	$2.75	$13,444.44
2		0	SY	Tree Clearing	$2.25	$0.00
3	801.IX.1	0	SY	Pavement Removal (COJ)	$12.50	$0.00
4	801.IX.2	0	SY	Paving Repair - Cross Cuts and Patches - Asphalt (COJ Case X)	$50.75	$0.00
5	801.IX.2	0	SY	Paving Repair - Cross Cuts and Patches - Base (COJ Case X)	$22.50	$0.00
6	801.X.5	244	SY	Replace Driveway (Gravel Access Road)	$14.00	$3,422.22
7	801.IX.6	0	SY	Existing Pavement - Milling & Resurfacing (COJ)	$23.50	$0.00
8	801.X.1	0	SY	Remove Concrete Sidewalk (COJ)	$25.00	$0.00
9	801.X.3	0	LF	Remove Curb and Gutter (COJ)	$15.00	$0.00
10	801.X.4	0	SY	Replace Concrete Sidewalk (COJ)	$85.00	$0.00
11	801.X.6	0	LF	Replace Curb and Gutter (COJ)	$35.00	$0.00
12	801.X.5	0	SY	Remove Unpaved Driveway	$5.00	$0.00
13	801.X.5	0	SY	Replace Unpaved Driveway	$10.00	$0.00
14	801.X.5	0	SY	Remove Concrete Driveway	$25.00	$0.00
15	801.X.5	0	SY	Replace Concrete Driveway Crossings	$45.00	$0.00
16	801.X.5	0	SY	Remove Asphalt Driveway Crossings	$12.50	$0.00
17	801.X.5	0	SY	Replace Asphalt Driveway Crossings	$65.00	$0.00
18	801.X.5	0	SY	Remove Ornamental Brick Driveway Crossings	$35.00	$0.00
19	801.X.5	0	SY	Replace Ornamental Brick Driveway Crossings	$50.00	$0.00
20		2	EA	Type B Crossings (4 - 30" 45° pipe fittings at each crossing)	$21,500.00	$43,000.00
21	801.XVII.1	610	LF	30" CLDI (PC150) Pipe Push-on (WM) - by open cut	$280.00	$170,800.00
22	801.XVII.1	610	LF	30" CLDI (PC150) Pipe, RJ (WM) - by open cut	$360.00	$219,600.00
23	801.XVII.3	0	EA	30" MJ Sleeve	$3,650.00	$0.00
24	801.XVII.3	10	EA	30" 45° MJ Bend, RJ	$3,900.00	$39,000.00
25	801.XVII.3	0	EA	30" 22.5° MJ Bend, RJ	$3,650.00	$0.00
26	801.XVII.3	0	EA	30" 11.25° MJ Bend, RJ	$3,650.00	$0.00
27	801.XVIII.1	1	EA	30" MJ Gate Valve	$48,320.00	$48,320.00
28	801.XVIII.4	3	EA	Manual Air Release Valve (MARV)	$3,750.00	$11,250.00
29	801.XXIV.1	0	LF	36" HDPE DR 11 DIPS Pipe by HDD	$1,050.00	$0.00
30	801.XXIV.1	0	LF	30" CLDI (PC150) Pipe, RJ (WM) - by Auger bore	$250.00	$0.00
31	801.XXIV.1	0	LF	48" Steel Casing - by Auger bore	$4,500.00	$0.00
				Cash Allowances		
32	801.XVII.1	1	LS	Testing Allowance		$0.00
33		1	LS	Law Enforcement Allowance		$0.00

SUBTOTAL (Includes Cash Allowance)		**$600,000.00**
GENERAL/SPECIAL CONDITIONS (MAX. 10% OF SUBTOTAL)	10%	**$100,000.00**
TOTAL (Subtotal plus General Conditions & Special Conditions)		**$700,000.00**
Contigency	30%	**$300,000.00**
TOTAL CONSTUCTION COST		**$1,000,000.00**

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2. The SIPS Route Study Cost Estimates are provided for comparison between Base and Alternate Routes. As such, these estimates represent the current estimate of each route and do not include escalation.
3. The purpose of cost estimates are to define the comparative construction costs of the various route alternatives. Since the purpose is not to set the initial capital budget, JEA Costs & Engineering (Project Management, Cost & Scheduling, General & Administrative, Permitting, Engineering and Services During Construction) have not been included in these cost estimates.

JEA-SIPS-Deerwood III to Greenland Route Study **Alternate 1**

Opinion of Probable Construction Cost - CLASS 5 **December 19, 2019**

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Item No.	Spec No.	Est. Qty.	Unit	Description	Unit Price	Total Price
1	801.VIII	62,333	SY	Grassing/Seeding	$2.75	$171,415.99
2		52,919	SY	Tree Clearing	$2.25	$119,067.03
3	801.IX.1	1,072	SY	Pavement Removal (COJ)	$12.50	$13,399.31
4	801.IX.2	1,072	SY	Paving Repair - Cross Cuts and Patches - Asphalt (COJ Case X)	$50.75	$54,401.18
5	801.IX.2	946	SY	Paving Repair - Cross Cuts and Patches - Base (COJ Case X)	$22.50	$21,281.25
6	801.X.5	0	SY	Replace Driveway (Gravel Access Road)	$14.00	$0.00
7	801.IX.6	9,554	SY	Existing Pavement - Milling & Resurfacing (COJ)	$23.50	$224,521.61
8	801.X.1	56	SY	Remove Concrete Sidewalk (COJ)	$25.00	$1,388.89
9	801.X.3	731	LF	Remove Curb and Gutter (COJ)	$15.00	$10,965.00
10	801.X.4	56	SY	Replace Concrete Sidewalk (COJ)	$85.00	$4,722.22
11	801.X.6	731	LF	Replace Curb and Gutter (COJ)	$35.00	$25,585.00
12	801.X.5	144	SY	Remove Unpaved Driveway	$5.00	$722.22
13	801.X.5	144	SY	Replace Unpaved Driveway	$10.00	$1,444.44
14	801.X.5	0	SY	Remove Concrete Driveway	$25.00	$0.00
15	801.X.5	0	SY	Replace Concrete Driveway Crossings	$45.00	$0.00
16	801.X.5	0	SY	Remove Asphalt Driveway Crossings	$12.50	$0.00
17	801.X.5	0	SY	Replace Asphalt Driveway Crossings	$65.00	$0.00
18	801.X.5	0	SY	Remove Ornamental Brick Driveway Crossings	$35.00	$0.00
19	801.X.5	0	SY	Replace Ornamental Brick Driveway Crossings	$50.00	$0.00
20		26	EA	Type B Crossings (4 - 30" 45° pipe fittings at each crossing)	$21,500.00	$559,000.00
21	801.XVII.1	13,849	LF	30" CLDI (PC150) Pipe Push-on (WM) - by open cut	$280.00	$3,877,720.00
22	801.XVII.1	13,849	LF	30" CLDI (PC150) Pipe, RJ (WM) - by open cut	$360.00	$4,985,640.00
23	801.XVII.3	1	EA	30" MJ Sleeve	$3,650.00	$3,650.00
24	801.XVII.3	22	EA	30" 45° MJ Bend, RJ	$3,900.00	$85,800.00
25	801.XVII.3	9	EA	30" 22.5° MJ Bend, RJ	$3,650.00	$32,850.00
26	801.XVII.3	11	EA	30" 11.25° MJ Bend, RJ	$3,650.00	$40,150.00
27	801.XVIII.1	26	EA	30" MJ Gate Valve	$48,320.00	$1,256,320.00
28	801.XVIII.4	46	EA	Manual Air Release Valve (MARV)	$3,750.00	$172,500.00
29	801.XXIV.1	12,780	LF	36" HDPE DR 11 DIPS Pipe by HDD	$1,050.00	$13,419,000.00
30	801.XXIV.1	550	LF	30" CLDI (PC150) Pipe, RJ (WM) - by Auger bore	$250.00	$137,500.00
31	801.XXIV.1	550	LF	48" Steel Casing - by Auger bore	$4,500.00	$2,475,000.00
				Cash Allowances		
32	801.XVII.1	1	LS	Testing Allowance		$0.00
33		1	LS	Law Enforcement Allowance		$0.00

SUBTOTAL (Includes Cash Allowance)		**$27,700,000.00**
GENERAL/SPECIAL CONDITIONS (MAX. 10% OF SUBTOTAL)	10%	**$2,800,000.00**
TOTAL (Subtotal plus General Conditions & Special Conditions)		**$30,500,000.00**
Contigency	30%	**$9,200,000.00**
TOTAL CONSTUCTION COST		**$39,700,000.00**

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3. The purpose of cost estimates are to define the comparative construction costs of the various route alternatives. Since the purpose is not to set the initial capital budget, JEA Costs & Engineering (Project Management, Cost & Scheduling, General & Administrative, Permitting, Engineering and Services During Construction) have not been included in these cost estimates.

JEA-SIPS-Deerwood III to Greenland Route Study **Alternate 2**

Opinion of Probable Construction Cost - CLASS 5 **December 19, 2019**

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Item No.	Spec No.	Est. Qty.	Unit	Description	Unit Price	Total Price
1	801.VIII	1,453	SY	Grassing/Seeding	$2.75	$3,994.68
2		0	SY	Tree Clearing	$2.25	$0.00
3	801.IX.1	242	SY	Pavement Removal (COJ)	$12.50	$3,022.22
4	801.IX.2	242	SY	Paving Repair - Cross Cuts and Patches - Asphalt (COJ Case X)	$50.75	$12,270.22
5	801.IX.2	213	SY	Paving Repair - Cross Cuts and Patches - Base (COJ Case X)	$22.50	$4,800.00
6	801.X.5	1,133	SY	Replace Driveway (Gravel Access Road)	$14.00	$15,866.67
7	801.IX.6	2,191	SY	Existing Pavement - Milling & Resurfacing (COJ)	$23.50	$51,491.11
8	801.X.1	200	SY	Remove Concrete Sidewalk (COJ)	$25.00	$5,000.00
9	801.X.3	595	LF	Remove Curb and Gutter (COJ)	$15.00	$8,925.00
10	801.X.4	200	SY	Replace Concrete Sidewalk (COJ)	$85.00	$17,000.00
11	801.X.6	595	LF	Replace Curb and Gutter (COJ)	$35.00	$20,825.00
12	801.X.5	0	SY	Remove Unpaved Driveway	$5.00	$0.00
13	801.X.5	0	SY	Replace Unpaved Driveway	$10.00	$0.00
14	801.X.5	0	SY	Remove Concrete Driveway	$25.00	$0.00
15	801.X.5	0	SY	Replace Concrete Driveway Crossings	$45.00	$0.00
16	801.X.5	0	SY	Remove Asphalt Driveway Crossings	$12.50	$0.00
17	801.X.5	0	SY	Replace Asphalt Driveway Crossings	$65.00	$0.00
18	801.X.5	0	SY	Remove Ornamental Brick Driveway Crossings	$35.00	$0.00
19	801.X.5	0	SY	Replace Ornamental Brick Driveway Crossings	$50.00	$0.00
20		5	EA	Type B Crossings (4 - 30" 45° pipe fittings at each crossing)	$21,500.00	$107,500.00
21	801.XVII.1	718	LF	30" CLDI (PC150) Pipe Push-on (WM) - by open cut	$280.00	$201,040.00
22	801.XVII.1	718	LF	30" CLDI (PC150) Pipe, RJ (WM) - by open cut	$360.00	$258,480.00
23	801.XVII.3	1	EA	30" MJ Sleeve	$3,650.00	$3,650.00
24	801.XVII.3	6	EA	30" 45° MJ Bend, RJ	$3,900.00	$23,400.00
25	801.XVII.3	1	EA	30" 22.5° MJ Bend, RJ	$3,650.00	$3,650.00
26	801.XVII.3	1	EA	30" 11.25° MJ Bend, RJ	$3,650.00	$3,650.00
27	801.XVIII.1	2	EA	30" MJ Gate Valve	$48,320.00	$96,640.00
28	801.XVIII.4	6	EA	Manual Air Release Valve (MARV)	$3,750.00	$22,500.00
29	801.XXIV.1	0	LF	36" HDPE DR 11 DIPS Pipe by HDD	$1,050.00	$0.00
30	801.XXIV.1	0	LF	30" CLDI (PC150) Pipe, RJ (WM) - by Auger bore	$250.00	$0.00
31	801.XXIV.1	0	LF	48" Steel Casing - by Auger bore	$4,500.00	$0.00
				Cash Allowances		
32	801.XVII.1	1	LS	Testing Allowance		$0.00
33		1	LS	Law Enforcement Allowance		$0.00

SUBTOTAL (Includes Cash Allowance)		**$900,000.00**
GENERAL/SPECIAL CONDITIONS (MAX. 10% OF SUBTOTAL)	10%	**$100,000.00**
TOTAL (Subtotal plus General Conditions & Special Conditions)		**$1,000,000.00**
Contigency	30%	**$300,000.00**
TOTAL CONSTUCTION COST		**$1,300,000.00**

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2. The SIPS Route Study Cost Estimates are provided for comparison between Base and Alternate Routes. As such, these estimates represent the current estimate of each route and do not include escalation.
3. The purpose of cost estimates are to define the comparative construction costs of the various route alternatives. Since the purpose is not to set the initial capital budget, JEA Costs & Engineering (Project Management, Cost & Scheduling, General & Administrative, Permitting, Engineering and Services During Construction) have not been included in these cost estimates.

JEA-SIPS-Deerwood III to Greenland Route Study **Alternate Segment 3A**

Opinion of Probable Construction Cost - CLASS 5 **December 19, 2019**

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Item No.	Spec No.	Est. Qty.	Unit	Description	Unit Price	Total Price
1	801.VIII	6,099	SY	Grassing/Seeding	$2.75	$16,771.94
2		0	SY	Tree Clearing	$2.25	$0.00
3	801.IX.1	5,667	SY	Pavement Removal (COJ)	$12.50	$70,833.33
4	801.IX.2	5,667	SY	Paving Repair - Cross Cuts and Patches - Asphalt (COJ Case X)	$50.75	$287,583.33
5	801.IX.2	5,000	SY	Paving Repair - Cross Cuts and Patches - Base (COJ Case X)	$22.50	$112,500.00
6	801.X.5	0	SY	Replace Driveway (Gravel Access Road)	$14.00	$0.00
7	801.IX.6	33,220	SY	Existing Pavement - Milling & Resurfacing (COJ)	$23.50	$780,670.00
8	801.X.1	6	SY	Remove Concrete Sidewalk (COJ)	$25.00	$138.89
9	801.X.3	3,710	LF	Remove Curb and Gutter (COJ)	$15.00	$55,650.00
10	801.X.4	6	SY	Replace Concrete Sidewalk (COJ)	$85.00	$472.22
11	801.X.6	3,710	LF	Replace Curb and Gutter (COJ)	$35.00	$129,850.00
12	801.X.5	0	SY	Remove Unpaved Driveway	$5.00	$0.00
13	801.X.5	0	SY	Replace Unpaved Driveway	$10.00	$0.00
14	801.X.5	0	SY	Remove Concrete Driveway	$25.00	$0.00
15	801.X.5	0	SY	Replace Concrete Driveway Crossings	$45.00	$0.00
16	801.X.5	0	SY	Remove Asphalt Driveway Crossings	$12.50	$0.00
17	801.X.5	0	SY	ReplaceAsphalt Driveway Crossings	$65.00	$0.00
18	801.X.5	0	SY	Remove Ornamental Brick Driveway Crossings	$35.00	$0.00
19	801.X.5	0	SY	Replace Ornamental Brick Driveway Crossings	$50.00	$0.00
20		19	EA	Type B Crossings (4 - 30" 45° pipe fittings at each crossing)	$21,500.00	$408,500.00
21	801.XVII.1	4,248	LF	30" CLDI (PC150) Pipe Push-on (WM) - by open cut	$280.00	$1,189,300.00
22	801.XVII.1	4,248	LF	30" CLDI (PC150) Pipe, RJ (WM) - by open cut	$360.00	$1,529,100.00
23	801.XVII.3	0	EA	30" MJ Sleeve	$3,650.00	$0.00
24	801.XVII.3	9	EA	30" 45° MJ Bend, RJ	$3,900.00	$35,100.00
25	801.XVII.3	0	EA	30" 22.5° MJ Bend, RJ	$3,650.00	$0.00
26	801.XVII.3	2	EA	30" 11.25° MJ Bend, RJ	$3,650.00	$7,300.00
27	801.XVIII.1	4	EA	30" MJ Gate Valve	$48,320.00	$193,280.00
28	801.XVIII.4	20	EA	Manual Air Release Valve (MARV)	$3,750.00	$75,000.00
29	801.XXIV.1	0	LF	36" HDPE DR 11 DIPS Pipe by HDD	$1,050.00	$0.00
30	801.XXIV.1	0	LF	30" CLDI (PC150) Pipe, RJ (WM) - by Auger bore	$250.00	$0.00
31	801.XXIV.1	0	LF	48" Steel Casing - by Auger bore	$4,500.00	$0.00
				Cash Allowances		
32	801.XVII.1	1	LS	Testing Allowance	$75,000.00	$75,000.00
33		1	LS	Law Enforcement Allowance	$25,000.00	$25,000.00

SUBTOTAL (Includes Cash Allowance)		**$5,000,000.00**
GENERAL/SPECIAL CONDITIONS (MAX. 10% OF SUBTOTAL)	10%	**$500,000.00**
TOTAL (Subtotal plus General Conditions & Special Conditions)		**$5,500,000.00**
Contigency	30%	**$1,700,000.00**
TOTAL CONSTUCTION COST		**$7,200,000.00**

Note: 1. In providing opinions of cost, financial analyses, economic feasibility projections, for the project, Jacobs has no control over cost or price of labor and materials; unknown or latent conditions of existing equipment or structures that may affect operation or maintenance costs; competitive bidding procedures and market conditions; time or quality of performance by operating personnel or third parties; and other economic and operational factors that may materially affect the ultimate project cost or schedule. Therefore, Jacobs makes no warranty that JEA's actual project costs, financial aspects, economic feasibility, will not vary from Jacobs' opinions, analyses, projections, or estimates.
2. The SIPS Route Study Cost Estimates are provided for comparison between Base and Alternate Routes. As such, these estimates represent the current estimate of each route and do not include escalation.
3. The purpose of cost estimates are to define the comparative construction costs of the various route alternatives. Since the purpose is not to set the initial capital budget, JEA Costs & Engineering (Project Management, Cost & Scheduling, General & Administrative, Permitting, Engineering and Services During Construction) have not been included in these cost estimates.

JEA-SIPS-Deerwood III to Greenland Route Study **Alternate Segment 3B**

Opinion of Probable Construction Cost - CLASS 5 **December 19, 2019**

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This document can be found on www.jea.com.
**Reference found in this solicitation.
***Refer to XXX-17 Appendix A Technical Specifications.

Item No.	Spec No.	Est. Qty.	Unit	Description	Unit Price	Total Price
1	801.VIII	0	SY	Grassing/Seeding	$2.75	$0.00
2		0	SY	Tree Clearing	$2.25	$0.00
3	801.IX.1	9,770	SY	Pavement Removal (COJ)	$12.50	$122,128.47
4	801.IX.2	9,770	SY	Paving Repair - Cross Cuts and Patches - Asphalt (COJ Case X)	$50.75	$495,841.60
5	801.IX.2	8,621	SY	Paving Repair - Cross Cuts and Patches - Base (COJ Case X)	$22.50	$193,968.75
6	801.X.5	0	SY	Replace Driveway (Gravel Access Road)	$14.00	$0.00
7	801.IX.6	56,860	SY	Existing Pavement - Milling & Resurfacing (COJ)	$23.50	$1,336,210.00
8	801.X.1	0	SY	Remove Concrete Sidewalk (COJ)	$25.00	$0.00
9	801.X.3	0	LF	Remove Curb and Gutter (COJ)	$15.00	$0.00
10	801.X.4	0	SY	Replace Concrete Sidewalk (COJ)	$85.00	$0.00
11	801.X.6	0	LF	Replace Curb and Gutter (COJ)	$35.00	$0.00
12	801.X.5	0	SY	Remove Unpaved Driveway	$5.00	$0.00
13	801.X.5	0	SY	Replace Unpaved Driveway	$10.00	$0.00
14	801.X.5	0	SY	Remove Concrete Driveway	$25.00	$0.00
15	801.X.5	0	SY	Replace Concrete Driveway Crossings	$45.00	$0.00
16	801.X.5	0	SY	Remove Asphalt Driveway Crossings	$12.50	$0.00
17	801.X.5	0	SY	ReplaceAsphalt Driveway Crossings	$65.00	$0.00
18	801.X.5	0	SY	Remove Ornamental Brick Driveway Crossings	$35.00	$0.00
19	801.X.5	0	SY	Replace Ornamental Brick Driveway Crossings	$50.00	$0.00
20		49	EA	Type B Crossings (4 - 30" 45° pipe fittings at each crossing)	$21,500.00	$1,053,500.00
21	801.XVII.1	5,173	LF	30" CLDI (PC150) Pipe Push-on (WM) - by open cut	$280.00	$1,448,300.00
22	801.XVII.1	5,173	LF	30" CLDI (PC150) Pipe, RJ (WM) - by open cut	$360.00	$1,862,100.00
23	801.XVII.3	0	EA	30" MJ Sleeve	$3,650.00	$0.00
24	801.XVII.3	4	EA	30" 45° MJ Bend, RJ	$3,900.00	$15,600.00
25	801.XVII.3	2	EA	30" 22.5° MJ Bend, RJ	$3,650.00	$7,300.00
26	801.XVII.3	18	EA	30" 11.25° MJ Bend, RJ	$3,650.00	$65,700.00
27	801.XVIII.1	5	EA	30" MJ Gate Valve	$48,320.00	$241,600.00
28	801.XVIII.4	45	EA	Manual Air Release Valve (MARV)	$3,750.00	$168,750.00
29	801.XXIV.1	0	LF	36" HDPE DR 11 DIPS Pipe by HDD	$1,050.00	$0.00
30	801.XXIV.1	0	LF	30" CLDI (PC150) Pipe, RJ (WM) - by Auger bore	$250.00	$0.00
31	801.XXIV.1	0	LF	48" Steel Casing - by Auger bore	$4,500.00	$0.00
				Cash Allowances		
32	801.XVII.1	1	LS	Testing Allowance	$75,000.00	$75,000.00
33		1	LS	Law Enforcement Allowance	$25,000.00	$25,000.00

SUBTOTAL (Includes Cash Allowance)		**$7,200,000.00**
GENERAL/SPECIAL CONDITIONS (MAX. 10% OF SUBTOTAL)	10%	**$800,000.00**
TOTAL (Subtotal plus General Conditions & Special Conditions)		**$8,000,000.00**
Contigency	30%	**$2,400,000.00**
TOTAL CONSTUCTION COST		**$10,400,000.00**

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2. The SIPS Route Study Cost Estimates are provided for comparison between Base and Alternate Routes. As such, these estimates represent the current estimate of each route and do not include escalation.
3. The purpose of cost estimates are to define the comparative construction costs of the various route alternatives. Since the purpose is not to set the initial capital budget, JEA Costs & Engineering (Project Management, Cost & Scheduling, General & Administrative, Permitting, Engineering and Services During Construction) have not been included in these cost estimates.

JEA-SIPS-Deerwood III to Greenland Route Study **Selected Route**

Opinion of Probable Construction Cost - CLASS 5 **December 19, 2019**

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***Refer to XXX-17 Appendix A Technical Specifications.

Item No.	Spec No.	Est. Qty.	Unit	Description	Unit Price	Total Price
1	801.VIII	322,740	SY	Grassing/Seeding	$2.75	$887,534.33
2		52,919	SY	Tree Clearing	$2.25	$119,067.03
3	801.IX.1	6,111	SY	Pavement Removal (COJ)	$12.50	$76,381.94
4	801.IX.2	6,111	SY	Paving Repair - Cross Cuts and Patches - Asphalt (COJ Case X)	$50.75	$310,110.69
5	801.IX.2	5,392	SY	Paving Repair - Cross Cuts and Patches - Base (COJ Case X)	$22.50	$121,312.50
6	801.X.5	22	SY	Replace Driveway (Gravel Access Road)	$14.00	$311.11
7	801.IX.6	37,808	SY	Existing Pavement - Milling & Resurfacing (COJ)	$23.50	$888,488.00
8	801.X.1	61	SY	Remove Concrete Sidewalk (COJ)	$25.00	$1,527.78
9	801.X.3	4,441	LF	Remove Curb and Gutter (COJ)	$15.00	$66,615.00
10	801.X.4	61	SY	Replace Concrete Sidewalk (COJ)	$85.00	$5,194.44
11	801.X.6	4,441	LF	Replace Curb and Gutter (COJ)	$35.00	$155,435.00
12	801.X.5	144	SY	Remove Unpaved Driveway	$5.00	$722.22
13	801.X.5	144	SY	Replace Unpaved Driveway	$10.00	$1,444.44
14	801.X.5	0	SY	Remove Concrete Driveway	$25.00	$0.00
15	801.X.5	0	SY	Replace Concrete Driveway Crossings	$45.00	$0.00
16	801.X.5	0	SY	Remove Asphalt Driveway Crossings	$12.50	$0.00
17	801.X.5	0	SY	Replace Asphalt Driveway Crossings	$65.00	$0.00
18	801.X.5	0	SY	Remove Ornamental Brick Driveway Crossings	$35.00	$0.00
19	801.X.5	0	SY	Replace Ornamental Brick Driveway Crossings	$50.00	$0.00
20		46	EA	Type B Crossings (4 - 30" 45° pipe fittings at each crossing)	$21,500.00	$989,000.00
21	801.XVII.1	19,457	LF	30" CLDI (PC150) Pipe Push-on (WM) - by open cut	$280.00	$5,447,820.00
22	801.XVII.1	19,457	LF	30" CLDI (PC150) Pipe, RJ (WM) - by open cut	$360.00	$7,004,340.00
23	801.XVII.3	1	EA	30" MJ Sleeve	$3,650.00	$3,650.00
24	801.XVII.3	38	EA	30" 45° MJ Bend, RJ	$3,900.00	$148,200.00
25	801.XVII.3	10	EA	30" 22.5° MJ Bend, RJ	$3,650.00	$36,500.00
26	801.XVII.3	15	EA	30" 11.25° MJ Bend, RJ	$3,650.00	$54,750.00
27	801.XVIII.1	33	EA	30" MJ Gate Valve	$48,320.00	$1,594,560.00
28	801.XVIII.4	69	EA	Manual Air Release Valve (MARV)	$3,750.00	$258,750.00
29	801.XXIV.1	12,780	LF	36" HDPE DR 11 DIPS Pipe by HDD	$1,050.00	$13,419,000.00
30	801.XXIV.1	550	LF	30" CLDI (PC150) Pipe, RJ (WM) - by Auger bore	$250.00	$137,500.00
31	801.XXIV.1	550	LF	48" Steel Casing - by Auger bore	$4,500.00	$2,475,000.00
				Cash Allowances		
32	801.XVII.1	1	LS	Testing Allowance		$0.00
33		1	LS	Law Enforcement Allowance		$0.00

SUBTOTAL (Includes Contingency and Cash Allowance)		**$34,300,000.00**
GENERAL/SPECIAL CONDITIONS (MAX. 10% OF SUBTOTAL)	10%	**$3,500,000.00**
TOTAL (Subtotal plus General Conditions & Special Conditions)		**$37,800,000.00**
Contigency	30%	**$11,400,000.00**
TOTAL CONSTUCTION COST		**$49,200,000.00**

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Attachment 3
Greenland Route Study Applicable Workshop Slides (10/10/2019)

CIP PROGRAM

JEA WATER/WASTEWATER CAPITAL PROGRAM MANAGEMENT

TASK ORDER S2:

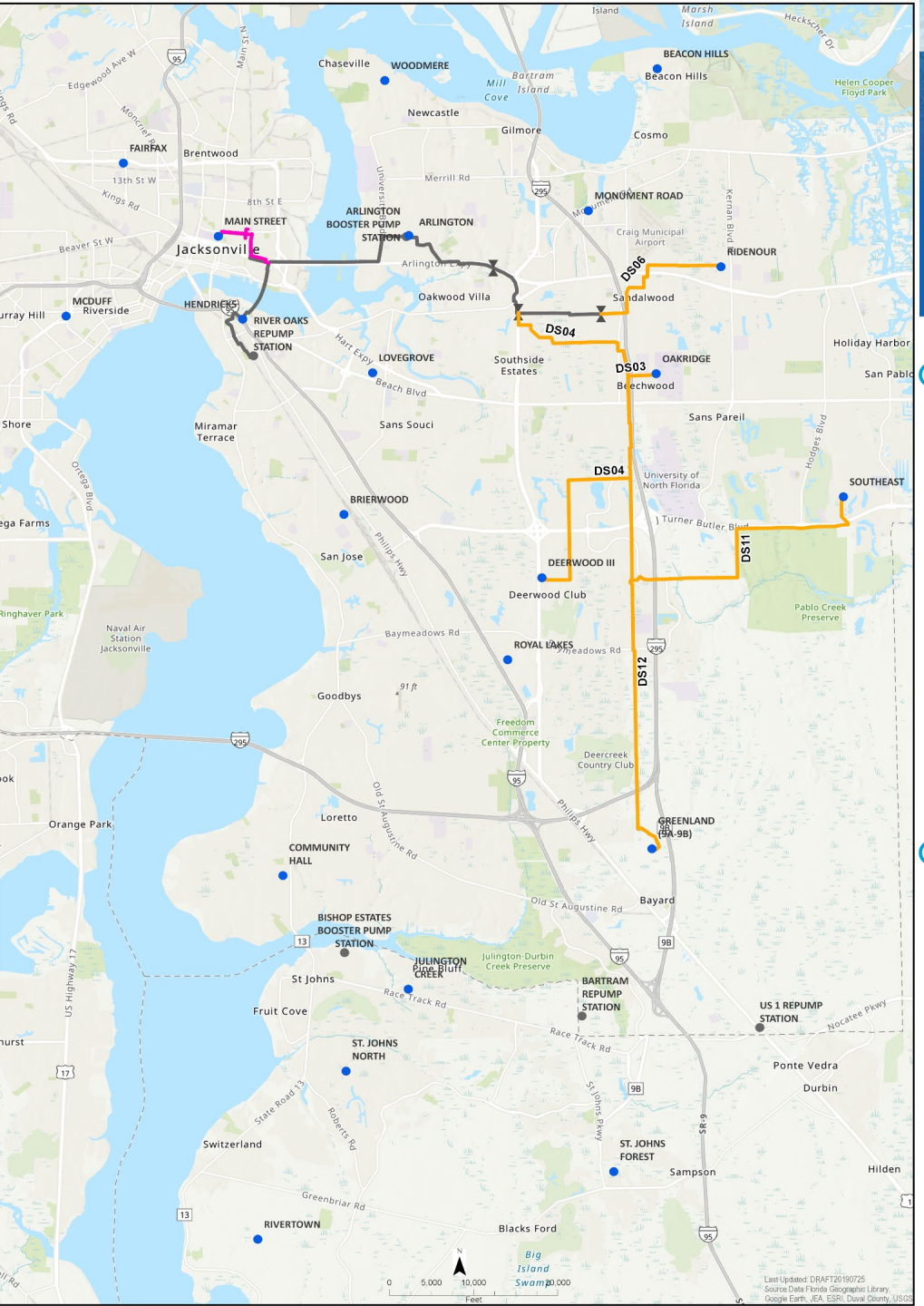
SIPS SUBPROGRAM ROUTE STUDY WORKSHOP

OCTOBER 10, 2019

JACOBS®

Southside Integrated Piping System (SIPS) Subprogram Overview/Background/Goals

- Challenge No. 1: Stable and reliable supply of safe drinking water to operate JEA's wellfields and WTPs in a sustainable manner.
- Challenge No. 2: JEA's large service area with varied supply, availability, demand and water quality characteristics separating the North & South Grids.
- Goals: Maximize investment in the existing JEA infrastructure (wells, grids, and WTPs) while increasing reliability and capacity on the North Grid and minimizing long-term water quality risks in the South Grid.
- SIPS Predecessors: iWATER and TWMP
- Solution: Utilize North Grid facilities (i.e., Main Street WTP) to supply the South Grid by providing a balanced water supply pipeline, storage and pumping network to support the demands and water quality of the South Grid.



SIPS Project Overview

- Initial Project Background – Five (5) pipeline projects (138,000 LF of 16”, 24” and 30” SIPS raw water main) – Conduct route studies in the near-term.
  - » Southside Blvd. Intertie to Deerwood III WTP
  - » Deerwood III WTP to Greenland WTP
  - » St. Johns Bluff to Oakridge WTP
  - » Cortez Intertie to Ridenour WTP
  - » Southeast WTP to T-Line
- Complete Route Studies by 10/25/19 for Southside Blvd. Intertie to Deerwood III WTP and Deerwood III WTP to Greenland WTP

Field Work - Overview

- Field team collected over 3,700 Data Points on the Southside Blvd Intertie to Deerwood III WTP and Deerwood III WTP to Greenland WTP Route Studies
- Field work data base includes photos and specific data entry with GPS

Field Work - Example

- Example of data collected - communication pole and GPS location in the route study
- Example of field data forms – available for output
- Verification of surface features – Confirm GIS accuracy
- Confirming out-of-date information (i.e. Temp Fire Station)

GIS Figure Development

- Identify base route and preliminary alternate routes
- Figure Base/Background (JEA GIS, COJ GIS, Aerials and Wetland Maps)
- As-Built/Record Drawing search/review (built library along routes and identified errors)
- Select As-Built/Record Drawings geo-referenced into GIS and traced into background (especially for dry utilities like gas and communications)
- Select Design/Construction Drawings geo-referenced into GIS
- Field data geo-referenced and included in background; combined with as-built/record drawing information to supplement and verify data
- Refined routes and alignment, and identified proposed installation/crossing method
- *Overall Value – High degree of confidence with early identification of route alignment to support accelerated design, permitting and construction*

Stakeholders – JEA Environmental

- Meeting held on August 20, 2019 (3 pm – 4 pm)
- Key Takeaways:
  - JEA Environmental encouraged a pragmatic approach to environmental considerations along the investigated pipeline routes. Environmental permitting considerations should be compared evenly with other options to drive the selection of the final route and installation method. Even the most complex environmental permits for each route and installation method can be obtained; however, the following 3 scenarios add complexity and time to the permitting process:
    - Open water crossings of a natural waterway
    - Impacts to hardwood forested wetlands
    - Stormwater management modifications (e.g. MS4 ditch, access road, etc.)
  - JEA potentially has a valid USACOE permit for some of the T-line routes
  - Initial Environmental takeaways include expected gopher tortoises in certain higher, drier areas (e.g., JTB T-Line); seasonably wetter areas (e.g., I-295 T-Line)

Stakeholders – JEA W/WW Operation & Maintenance

- Meeting held on August 21, 2019 (8 am – 9 am)
- Key Takeaways:
  - No significant concerns were identified along the Deerwood and Greenland route alternatives.
  - Isolation valve spacing at 1000 ft is preferred but O&M is open to variances based on logical valve locations (e.g. intersections, FDOT and wetland crossings).
  - Air release utilizing Manual Air Release Valves (MARVs), similar to the TWMP Program philosophy, was acceptable to O&M.

Stakeholders – JEA Real Estate, W/WW System Planning and Joint Agency Projects

- Meeting held on August 21, 2019 (2 pm – 3 pm)
- Key Takeaways:
  - JEA Real Estate confirmed that the CrossRoad Church UMC owns the east 75’ of the T-Line north of Gate Pkwy. The church has requested a new driveway access through this area which may provide an opportunity for JEA to negotiate the addition of 15’ to JEA’s Fee Simple Property for the new 30” SIPS raw water main in this corridor.
  - JEA Real Estate agreed to provide a full accounting of T-Line property rights.
  - JEA Joint Agency Projects stated that the only JP project along the route alternatives at this time is the COJ Deerwood Park Blvd Bridge project. JP has added an alternate bid item to the COJ project for installation of a 30” dry line by open-cut.
  - JEA Planning identified an existing failed HDD in the T-line near I-295 crossing JTB.
  - JEA Planning provided information on a planned easement east of I-295.

Stakeholders – JEA Power Transmission

- Meeting held on August 22, 2019 (9 am – 10 am)
- Key Takeaways:
  - JEA Power Transmission is concerned about the I-295 North-South T-Line corridor. The T-Line is the primary feed to the south and has a major load and no redundancy (no looping). Concerns center on construction in the vicinity of their power poles. Outages in this area would be very difficult or unavailable.
  - If the new 30” raw main is constructed within 20’ of a transmission pole, then the main would need to be installed in a 40’ casing centered on the pole. An additional consideration would include sheet piling in lieu of casing.
  - Construction equipment and personnel are not allowed within 20’ of any energized conductors. The power line sag (lowest conductor point) is the worst case area.

Stakeholders – JEA Power Distribution

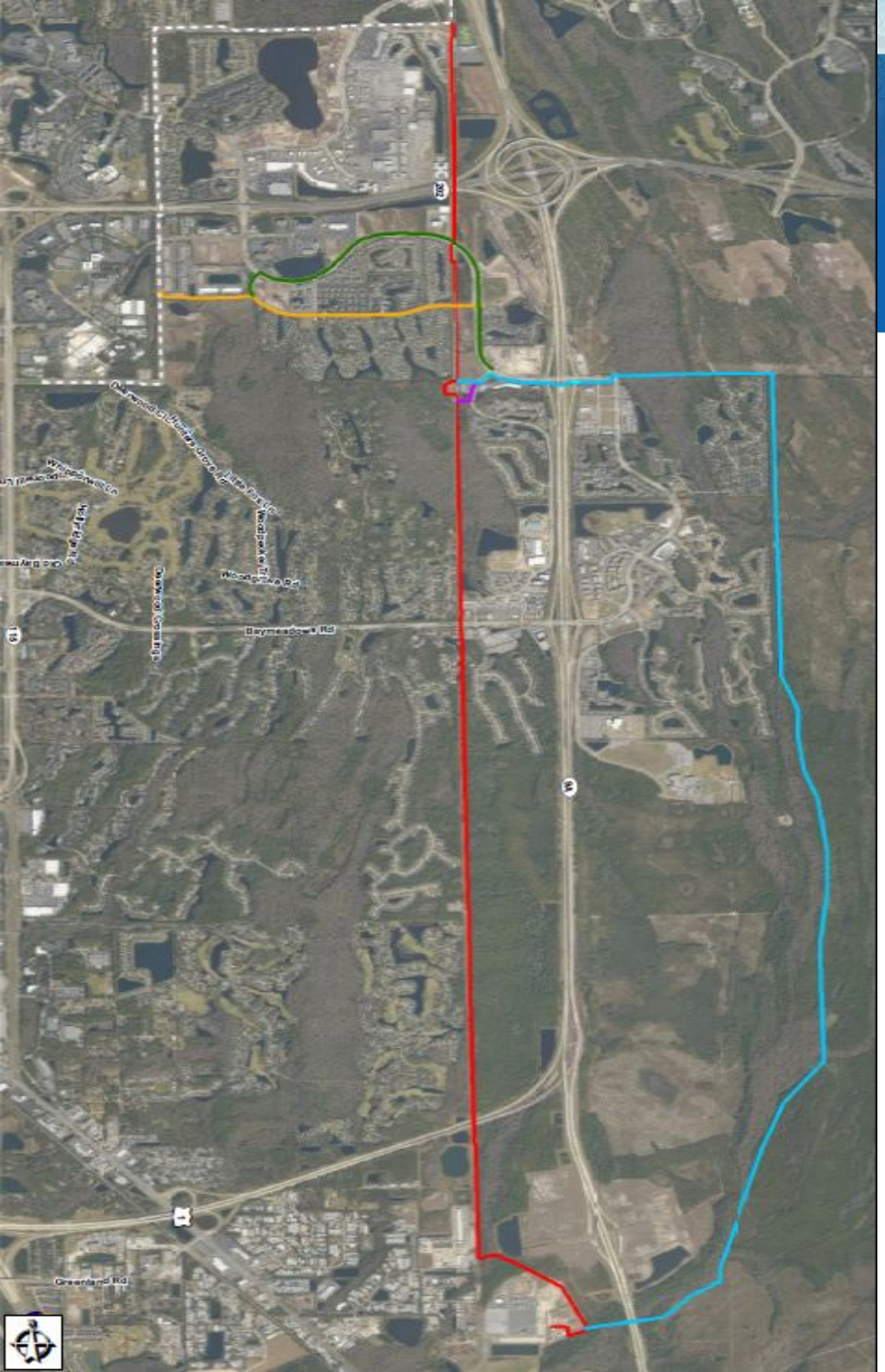
- Meeting held on August 22, 2019 (2 pm – 3 pm)
- Key Takeaways:
  - A distribution power outage will be required if construction activity is within 10’ of an energized distribution conductor.
  - JEA is considering a new UGE distribution line from Forest Substation to the Deerwood WTP for Vistakon®.
  - JEA is also considering another UGE distribution line from Forest S/S to UNF.
  - JEA Power Distribution confirmed that poles were typically be 8’-10’ deep, and that a 1:1 slope adjacent to distribution poles generally would not require a pole “hold”.

Agency – Florida Department of Transportation (FDOT)

- Meeting held on September 16, 2019 (9:30 am – 10:30 am)
- Key Takeaways:
  - FDOT does not allow open-cut of new pavement (5 years or less). A variance to this rule can be requested but would likely require full width restoration.
  - JEA is contesting a recent FDOT requirement to case a pipeline to be installed in a limited access roadway crossing. The current FDOT Design Manual does not require casings for limited access roadway crossings.
  - Gate/I-295 Interchange – FDOT noted the on-going project and the large culverts with canal on the south side of the overpass.
  - FDOT noted that if bridge plans are needed early in the concept development stage of design that we should proceed with a permit submittal to release the plans.

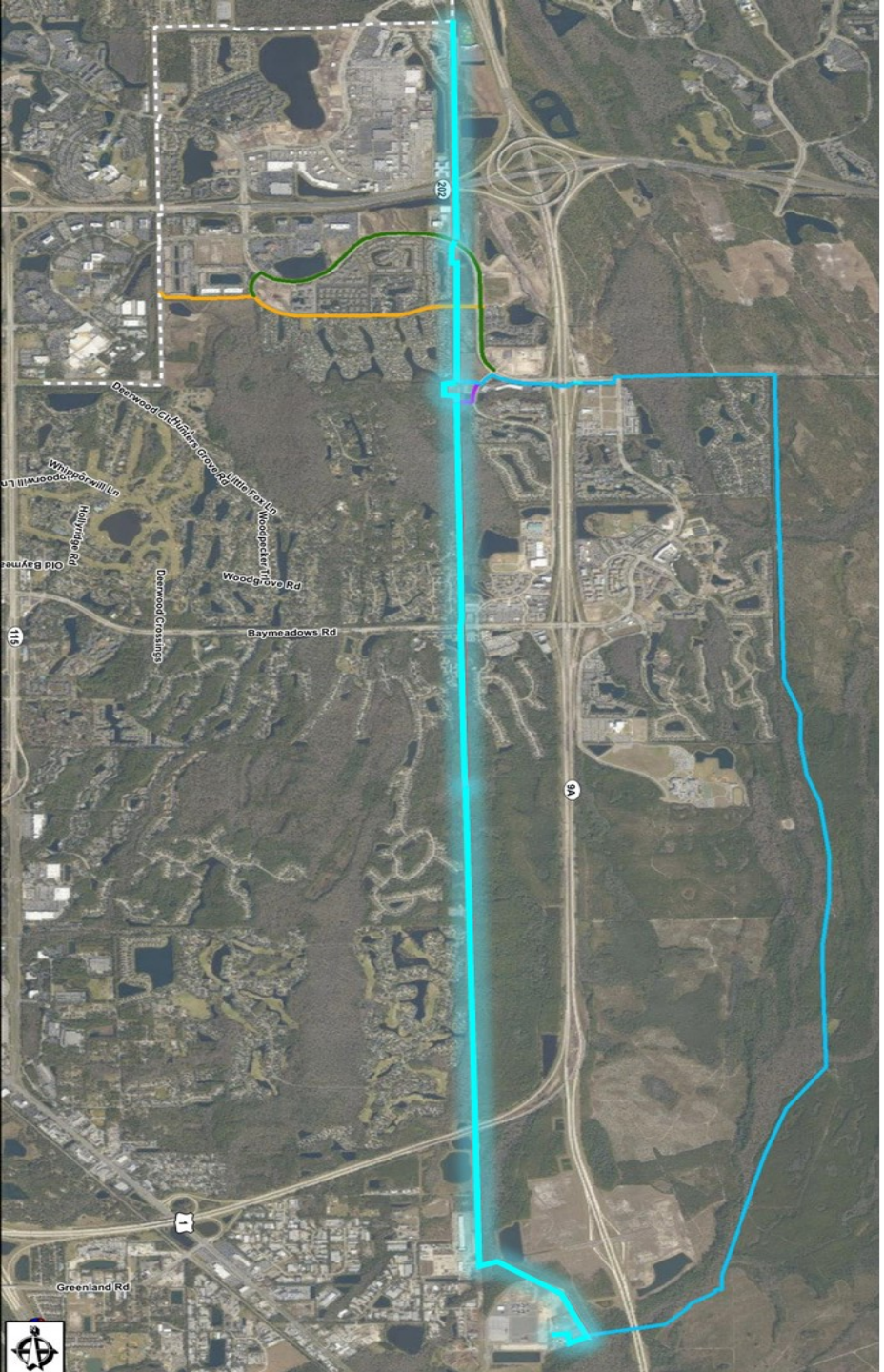
Agency – City of Jacksonville (COJ)

- Meeting held on September 24, 2019 (11 am – Noon)
- Key Takeaways:
  - » Forest Blvd (Beach Blvd to Atlantic Blvd) was resurfaced 1-2 years ago.
  - » A Gate Pkwy Resurfacing project is on hold for a JEA Reclaimed Water Main project in the outside northbound/westbound lane. Potentially could add the new 30” SIPS raw water main to the current project.
  - » Anticipated Restoration:
    - Newly resurfaced roads will likely require full width mill and overlay restoration when impacts are parallel to roadway.
    - Old roads will likely require mill and overlay restoration of just the impacted travel lanes when impacts are parallel to roadway.
    - Road crossings (new and old) will require milling and resurfacing 50’ each side of crossing (Case IX).
  - » COJ confirmed their 5-year project list was available – We acknowledged that JEA provided.



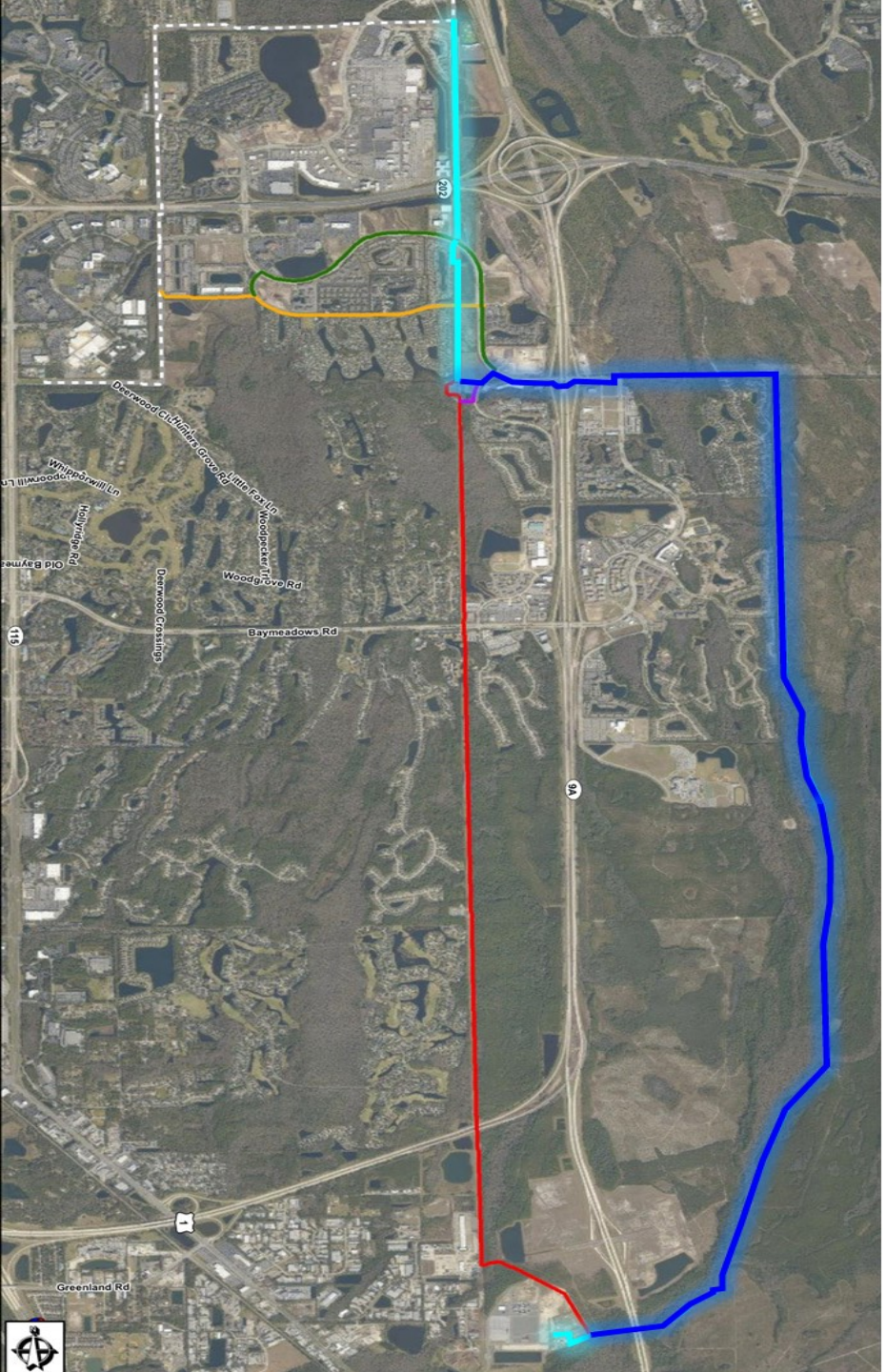
Detailed Scope/Activity Discussion

- Activity 5 – Route Study – Southside Blvd. – Deerwood III WTP to Greenland WTP
  - » Route study kickoff workshop
  - » Surface reconnaissance field visits
  - » Summarize advantages/disadvantages
  - » Preliminary route map(s)
  - » JEA Real Estate assessment
  - » Construction delivery analysis
  - » Draft route study
  - » Route Study Review and Workshop
  - » Final route study



Deerwood III to Greenland Base Route (BR)

Critical Component	Base Route
Total Length of Pipeline	43,220 LF
Open-Cut Installation	Gate Pkwy, Burnt Mill Rd, Old Still Rd, and Baymeadows Rd
Key Open-Cut Crossings	(1) – One Open-Cut Crossing of Burnt Mill Rd
Trenchless Auger Bore Crossings	(2) – 435 LF (Gate Pkwy and Baymeadows Road)
Trenchless HDD Installations	(4) – 6,855 LF (Two wetland crossings along the T-Line, JTB and I-295)
FDOT Permitting	(3) – JTB Blvd, Baymeadows and I-295
Easements/Real Estate	(2) – 30’ wide parcel along the north side of Point Meadows Substation (less than 50’ long) and in T-Line south of PMSS for HDD under private property also 30’ wide, but 3,000’ long.



Deerwood III to Greenland Alternative 1

Critical Component	Alternative Route 1
Total Length of Pipeline	41,030 LF (replaces 31,070 LF with BR)
Open-Cut Installation	Point Meadows Drive and Gate Pkwy
Key Open-Cut Crossings	(1) – Open-cut crossings of Point Meadows Drive
Trenchless Auger Bore Crossings	(3) – 550 LF adjacent to Gate Pkwy with I-295 and Interchange Ramps
Trenchless HDD Installations	(7) – 12,780 LF of HDDs required for Alternative Route 1 (Six wetland crossings and one 9B crossing)
FDOT Permitting	(2) – I-295 and 9B crossings
Easements/Real Estate	(1) – The predominance of the route utilizes an easement, which includes the installation east of the end of Gate Pkwy (east of I-295) and the entire run southward to the Greenland WRF

Deerwood III WTP to Greenland WTP
Base Route (BR) vs. BR-Alternative 1

Critical Component	Base Route	Base Route + Alt Route 1
Total Pipeline	43,220 LF	53,180 LF
Trenchless Auger Bore Crossings	Two (2) @ 435 LF (Gate Parkway and Baymeadows Road)	Four (4) @ 700 LF (Gate Pkwy, I-295 Interchange Ramps and I-295)
Trenchless HDD Installations	(4) – 6,855 LF (Two wetland crossings along the T-Line, JTB and I-295)	(8) – 13,960 LF of HDDs (Six wetland crossings and one 9B crossing)
Community Impact Value	• No residential MOT • Minimal commercial MOT • Minimal School/Church Impact	• Increased residential MOT (Gate) to BR • Increased commercial MOT (Gate) to BR • Minimal School/Church Impact
Environmental Value	• Trenchless Crossing of Wetlands (2) • Minimal Tree Impact (Pipe Installed in ROW, T-Line, Easements and JEA Prop) • No Known Contamination • Endangered Species – Gopher Tortoise	• Increased Wetland Exposure and Tree Impact to BR with new easement • No Known Contamination • Endangered Species – Gopher Tortoise and new easement likely to have more
Permitting (FDOT & COJ)	FDOT (3): Baymeadows, JTB and I-295 crossings COJ (over 500 LF across 3 COJ streets)	FDOT (3): JTB Blvd, I-295 and 9B crossings COJ (over 4,000 LF along and across 3 COJ)
Easements/Real Estate	(2) – 30’ wide parcel along the north side of Point Meadows S/S (50’ long) and in T-Line south of PMSS for HDD under private property also 30’ wide x 3,000’ long. Lowest overall easements (approx. 2 acres in total)	(2) – One small easement (30’ x 400’) from PMSS to Point Meadows Dr and one large easement for the majority of the route east of I-295 to the Greenland WRF >> BR. Largest overall easements (approx. 21 acres)
Total Cost (no easement cost)	**$33,700,000**	**$49,100,000**

Deerwood III to Greenland Base Route Alt 2 and Alt 3A/3B

- Alternative Route 2
  - » Navigating the northern, western and southern edges of the Point Meadows Substation requires an easement along the north, and installation in wet areas to the west and south. An alternative to this alignment follows Alternative Route 1 to the east to Point Meadows Dr and then southward and westward to rejoin the T-Line to the south of PMSS. The 1,436 LF replaces 1,220 LF from the BR. While it does avoid open cut in wet areas (BR), it will require additional tree removal and easements compared to BR.
- Alternative Route 3A
  - » Utilizes Validus Rd to Burnt Mill Rd to either the I-295 T-Line or Gate Pkwy. Route becomes viable for Greenland if Deerwood BR is not selected. Alternative 6A includes approximately 8,500 LF.
- Alternative Route 3B
  - » Viable for Greenland if Deerwood BR is not selected. Utilizes Validus Rd and Gate Pkwy to connect at the I-295 T-Line or continue along Gate Pkwy to Greenland Alternative 1. Alt 6B includes approximately 10,350 LF. *This alternative would share Gate Pkwy with on-going 8" reclaimed water main project (currently at 90% design). JEA already committed to Gate Pkwy repaving (north section).*

Attachment 4
Final Selected Route – GIS Figures

Attachment 5
Base Route – GIS Figures

Attachment 6
Alternate Route – GIS Figures