TECHNICAL MEMORANDUM

Index Number 102-37 SIPS – Greenland – Southside Blvd – Deerwood 3 to Greenland WTP - W

PREPARED FOR: JEA CAPITAL BUDGET PLANNING

PREPARED BY: WATER/WASTEWATER SYSTEMS PLANNING

DATE: February 5, 2018 Susan R. West, P.E.

Revision	History (add r	ows as needed)	
Version	Date	Author	Comments
2.0	2-Mar-21	Elizabeth DiMeo	Updated PD to incorporate selected route, additional scope
			(priority 1 projects), updated estimate and project schedule.
			Renamed pipeline program to SIPS.

Introduction

This Technical Memorandum (TM) is prepared for a planned water main extension. The proposed project was identified as part of the iWater study which is investigating JEAs future water supply needs (Project Number DS12). Implementation of this project will deliver raw water from the Main Street WTP (North Grid) to the Greenland WTP which serves the South Grid resulting in a direct offset of water withdrawal from the JEA South Grid wellfield of concern. This project will expand the hydraulic influence of the TWMP (Total Water Management Plan). Approximately 40,500 feet of 30" water main is planned. This TM identifies the route, itemizes potential design and construction considerations, provides a preliminary opinion of probable cost and includes a proposed project schedule.

Justification & Project Description

This project is part of the Southside Integrated Water System (SIPS) for the South Water Grid and was identified as part of the iWater project (Project Number DS12). Preliminary modeling reveals this project will improve the reliability and consistency of water pressures within the South Grid by providing a dedicated water feed to the Greenland WTP. This is a continuation of CIP 102-34 SIPS Deerwood- Southside Blvd Intertie to Deerwood III WTP. It is proposed to install approximately 40,500 feet of 30" water main from the 30" water main stub out provided by CIP 102-34 from the intersection of Validus Dr and Burnt Mill Parkway to the Greenland WTP. See Figure 1: Overall Project area map.

Scope

Capacity

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

Route & Alignment

It is proposed to install approximately 40,500 feet of 30" water main from the proposed 30" water main with CIP 102-34 at the intersection of Validus Dr and Burnt Mill Rd to the Greenland WTP. No stub-outs or connections are proposed. The route of this pipeline will utilize transmission easements, public right-of-ways and other obtained easements. The pipeline will cross I-295 around the Gate Parkway interchange. See Figure Wetland and flood zone crossings will also be required. Coordination with the electrical transmission group will be required. This project should include the piping needed to connect to the

Greenland WTP. This project is located in Duval County. Figures 1 and 2 detail the project work area. This project is located in Duval County. Figures 1 and 2 detail the project work areas.

CIP	Project Name	iWater No.	Pipe Size
102-34	SIPS Deerwood - Southside Blvd Intertie to Deerwood III WTP	DS04	30
102-35	SIPS Oakridge - Saints Rd - St. Johns Bluff to Oakridge WTP	DS03	30
102-36	SIPS Ridenour - Cortez to Ridenour WTP	DS06	24
102-38	SIPS Southeast - T Line to Southeast WTP	DS11	16
102-37	SIPS Greenland - Southside Blvd - Deerwood III to Greenland WTP	DS12	30

Individual route studies were performed by Jacobs Engineering for the Southside Blvd Intertie to Deerwood III WTP, Oakridge - Saints Rd - St. Johns Bluff to Oakridge WTP and Greenland - Southside Blvd - Deerwood III to Greenland WTP segments. The route study for 102-36 Ridenour - Cortez to Ridenour WTP was deferred and will be completed in later budget years, if the project is needed. The CIP project 102-38 Southeast - T Line to Southeast WTP pipeline segment has been deleted, it was determined by W/WW Planning that this line is not needed.

See Figure 1-Overall Project area (Initial) and Figure 2- Selected routes for CIP 102-34, 102-37 and 102-25.

At the southern portion of the SIPS Greenland pipeline route, there are three projects that are in construction and segments of SIPS- Greenland 30-inch water main will be constructed and funded under CP102-37.

- 1. Developer Cost Participation- Apex Trail
- 2. Greenland WRF
- 3. Greenland Pipe Program

Also as part of the SIPS Greenland design and construction, capital project 417-47 – Davis - Gate Pkwy To RG Skinner - Trans - R will be design and constructed.

See Figure 3: Greenland Route Map Modified.

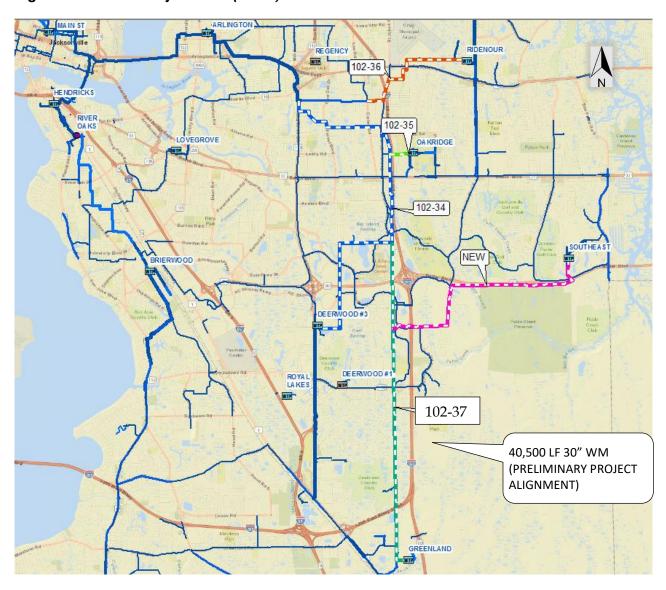


Figure 1 – Overall Project Area (Initial)



Figure 2 - Selected routes for CIP 102-34, 102-37 and 102-25

Segment 3: Southeast Quadrant Easement Segment 5: Greenland WRF 30" DI WM executed by Haskell/Jacobs Greenland ETM/Southeast Quadrant Development Executed by SIPS Greenland Designer Segment 4: Davis Easement 30" DI WM & 30" DI RWM WRF Team *Responsible for execution (schedule, design, construction) *Executed by SIPS Greenland Designer *Survey by Southeastern Segment 6: 9B Crossing Executed by Garney/MM Team *Responsible for execution (schedule, design, construction) Segment 7: GEC/Greenland WTP Tie *Executed by SIPS Greenland designer Segment 2: Burnt Mill Rd/ Gate Pkwy/I-295: 30" DI WM Executed by SIPS Greenland Designer Segment 1: Validus Easement Will be designed and constructed under the SIPS Deerwood Project.

Figure 3b: Final Selected Route: SIPS- Greenland (Modified)

Priority 1 & 2 Projects

Priority 1 projects are projects identified in the 2018 iWATER Master Plan and are deemed to be critical for the 30-inch pipeline to be fully operational upon construction completion. Therefore, the priority 1 project scopes and associated costs are being added to this project definition below and see Appendix C for detailed scope statement prepared by Jacobs Engineering.

Priority 2 projects are projects also identified in the 2018 iWater Master Plan but they are not critical to the 30-inch pipeline to be operational. The priority 2 projects will be listed in this project definition. However, the scope and costs are not included in this project.

Priority 1 Projects

The priority 1 projects identified in the iWater Master Plan and that are being included in this project are the following (See Appendix C for further detail):

1. Water Quality Monitoring Stations

A water quality monitoring station will be installed at the Greenland WTP to enable water quality monitoring for biomass growth, bacteria growth, and/or taste and odor development.

The design of the SIPS Water Quality Monitoring Station is anticipated to include the following:

- A removable coupon assembly to monitor for biomass growth on interior surfaces of the
 pipeline will be included at the Greenland WTP SIPS Intertie Station. The assembly will be
 manufactured by Metal Samples Company, Model RT4000 or similar.
- Permanent sample taps will be provided in the SIPS Greenland WTP Pipeline project for manual sampling.

Final Water Quality Monitoring Station scope/design will be in alignment to the final design of the water quality monitoring stations designed in 102-34: SIPS Deerwood Project.

2. Greenland WTP SIPS Intertie Station

A new SIPS Intertie Station will connect the SIPS Greenland WTP Pipeline to the Greenland WTP (see Figure 1 Appendix C). Work on the new intertie station is expected to take place within the boundaries of the WTP site; therefore, additional real estate will not need to be acquired. The design and construction of the new SIPS Intertie Station is anticipated to consist of the following:

- 30-inch yard piping to connect the 30-inch SIPS Greenland WTP Pipeline to the new Greenland WTP Intertie Station.
- 30-inch yard piping from the Intertie Station to the existing 1 million-gallon (MG) ground storage tank and a new 1.1 MG ground storage tank with isolation valves to each.
- SIPS fill line connections to the existing and new ground storage tanks. The tank connections are anticipated to be similar to the existing Arlington WTP TWMP fill line connection and include the following:
 - 30-inch ductile iron standpipe pipe external to the tank supported primarily off the external grade with stabilization support off the side and top of the tank wall
 - 30-inch tank dome penetration
 - The design shall include verification of the need for the surge relief valve for redundancy purposes.
 - Pressure piping, valves and appurtenances shall conform to the latest version of

the JEA Water & Wastewater Standards Manual.

3. Supervisory Control and Data Acquisition (SCADA) System

SCADA will control delivery of water from the SIPS pipeline to supplement the local wellfield supply and maintain CUP compliance. The following facilities will require SCADA control and monitoring from the

Ridenour WTP Control Room:

- SIPS Intertie Stations
- Main Street WTP High Service Pump Station
- Arlington Booster Pump Station

The SIPS Deerwood WTP Intertie Station, Main Street WTP, and Arlington Booster Pump Station SCADA control and monitoring improvements are anticipated to be implemented with the SIPS Deerwood III WTP Priority 1 project, therefore this Priority 1 project will only include the SCADA design necessary at the SIPS Greenland WTP Intertie Station. The overall control strategy and framework will be developed as part of the SIPS Deerwood III WTP Priority 1 project.

The following major instrumentation and controls (I&C) components and services are anticipated for integration of the SIPS Greenland WTP Intertie Station with the existing control system infrastructure:

- Electromagnetic flowmeter and interface
- Remote Input/Output (RIO) panel
- Hardware Siemens per current JEA standards
- Uninterruptible power supply
- Fiber-optic cabling for interfacing the proposed RIO with the existing WTP control network JEA will perform the programming required to integrate these new components into their existing control network at the Deerwood III WTP and at the Ridenour Control Room.

Final SCADA integration scope will be revised to align with the SCADA integration design work that is currently underway for the 102-34 SIPS Deerwood project.

4. Greenland WTP Ground Storage Tank

The need for a new ground storage tank at the Greenland WTP was identified as a SIPS Greenland WTP Priority project in the TM titled Activity 3: Integrate iWATER Program Recommendations into SIPS (Jacobs, 2020). JEA elected to size the new third storage tank at 1.1 MG to match the planned second 1.1 MG storage tank that is currently under construction. The usable volume of the new storage tank should be no less than 1.0 MG. The design and construction of the new Greenland WTP ground storage tank is anticipated to consist of the following:

- A 1.1 MG prestressed concrete ground storage tank designed to AWWA D110 and ACI 372
 - standards
- Tank Dimensions: Diameter should not exceed 80 feet with a side wall depth of 30.33 feet.
- Tank Piping Connections:
 - 30-inch SIPS water fill (dome penetration)
 - 24-inch raw water fill (floor penetration) with internal standpipe to the tray aerator on

the dome of the tank. The tray aerator piping discharge elevation should match the

- existing ground storage tank discharge elevations.
- 30-inch tank discharge (floor penetration) with fiberglass vortex breaker
- Tank overflow (floor penetration) with internal standpipe
- Tank drain line to three recessed floor penetrations
- Tray Aerators for Sulfide Removal: Fiberglass tray aerator rated at 15 gpm/square foot, with
 - seven trays and a minimum 12-inch separation.
- Ventilation Fans: Four aluminum vane axial, forced-draft ventilation fans. The fans will
 provide one air change per minute for the air volume above the high-water level in the
 tank.
- Level Controls: Submersible pressure transducer and level alarm switches.
- o Emergency Overflows: A minimum of eight emergency overflows on the dome.
- o Handrail: Aluminum handrail around the tank perimeter.
- o Stairs: Exterior aluminum stairs with aluminum railing and landing.
- Ladder: Interior ladder constructed from fiberglass, reinforced plastic and safety-climb device.
- o Baffles: Interior polypropylene baffle curtains.
- All interior surfaces of the tank and pipes will be coated with NSF 61 certified paint systems. The tanks will be coated per JEA's latest standard concrete storage tank coating systems.

The design and construction of the new Greenland WTP ground storage tank is also anticipated to consist of the following supporting work:

- o Yard piping: The anticipated yard piping is shown in Appendix C, Figure 1.
 - All new pressure piping located on the WTP site shall be restrained-joint cement lined ductile iron (CLDI) pipe per Section 350 – Potable Water Piping in the JEA Water & Wastewater Standards Manual.
 - All new isolation valves shall be resilient seat gate valves per Section 351 Water Valves & Appurtenances in the JEA Water & Wastewater Standards Manual.
- A hydraulic evaluation of the existing and proposed water mains from the ground storage tanks to the high service pumps should be performed during the design phase with a goal of providing similar flow from the tanks when operated in parallel and series.
- Clear and grade the existing JEA WTP site as needed to construct the new 1.1 MG storage tank and associated yard piping.
- Remove and replace existing security fence along the JEA property lines as shown in Figure 1. Provide a new security gate along the north side of the new 1.1 MG storage tank and WTP Intertie Station.
- Evaluation of the existing WTP electrical systems (primary and backup) to accommodate the additional electrical loads associated with the storage tank.
- Electrical and instrumentation and controls associated with the 1.1-MG ground storage tank and connection to the WTP Intertie Station.
- Evaluation of the existing stormwater management system for the new WTP improvements.
 - Stormwater management system improvements are not anticipated however will be as needed to meet the requirements of the Environmental Resource Permit (ERP)

Method of Construction

The methods of installation for the proposed water main shall be by any means necessary in accordance with the latest edition of the JEA Water & Sewer Standards Manual and as allowed by the City of Jacksonville and other applicable governing agencies. The project engineer should determine the most

economical pipe routing and installation methods while remaining consistent with the JEA standards and specifications. An equivalent pipe diameter of 30" PVC should be maintained when selecting pipe size and material.

Special Crossings

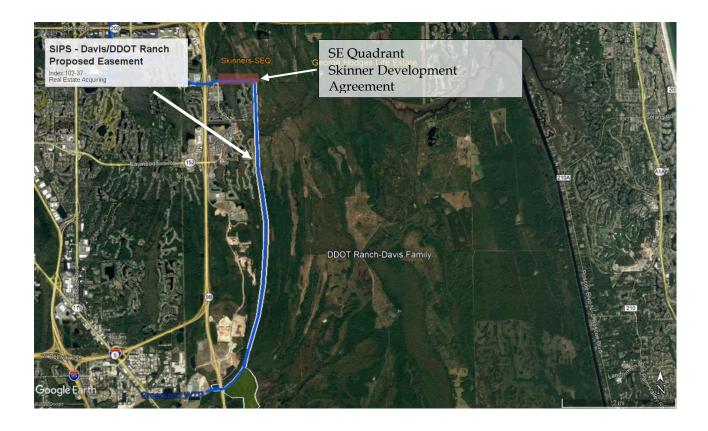
The installation route will require crossings of City of Jacksonville and FDOT roadways. Other JEA water, sewer and electric facilities are located along the proposed corridor. It is expected other utilities such as gas, phone, fiber optic and cable are also present in some locations. In areas of limited space, travel lane encroachment or temporary construction easements may be required. It is expected that horizontal directional drills (HDD) will be required along the final route.

Land Ownership/Real Estate Issues

It is anticipated the pipe installation will occur within public rights-of-way, JEA fee simple owned tracts and within JEA easements on private properties. During the route study several properties were identified that required permanent easements to accommodate the final selected route, see figure below. Real Estate is actively working on the following parcels:

- Point Meadows
- Wawa
- Skinner Dev Agreement
- Davis Family Easement





Survey Requirements

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

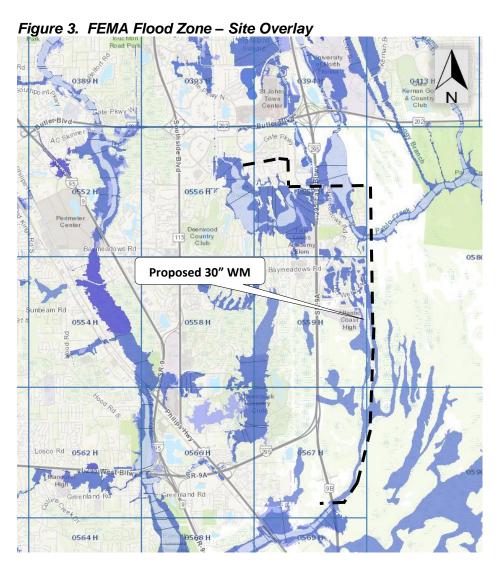
Boundary survey and wetland flagging limits survey work has been completed by Southeastern Land Surveying along the Davis Family Easement corridor for real estate acquisition. It would be beneficial to the project for the selected design firm to utilize Southeastern for the topographic survey along this section of the pipe route.

Site Development Characteristics

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

Limits of Flood Plain

The project corridor crosses multiple flood plain areas per FEMA FIRM panels 394, 557, 559 and 567 for Duval County (see Figure 3). While work will likely occur within the 100 year flood plain, no additional permitting is anticipated as the finished grade of the work limits should be consistent with the original elevations.



Permit List

It is anticipated that at a minimum permits will be required by the City of Jacksonville (10 set review and Right-of-Way permit), Florida Department of Environmental Protection, FDOT, St. Johns River Water Management District and the Army Corps of Engineers. The project corridor should be evaluated for the presence of jurisdictional wetlands, listed species and protected trees. The need for any associated permitting should be addressed during the design phase. Other permits may be determined necessary during the design process and will be obtained by the design team.

Risks

The purpose of this water main project as well as the future interconnected water mains is to expand the hydraulic influence of the TWMP and offset the volume of water withdrawn from the JEA South Grid wellfields. The proactive installation of infrastructure will help ensure a stable, reliable water source is available to all JEA customers in the future.

Project Schedule

Milestone	Project Request	PD/10% Design	30% Design	60% Design	90% Design	100% Design	Bid
Project Start	08-Feb-18	22-Jul-20					
Design Start	18-Aug-20	07-Dec-21					
Design Finish	12-May-21	18-May-23					
Construction Start	17-Sept-21	23-Jan-24					
Substantial Completion	17-Aug-23	22-Dec-25					
Final Completion	24-Sept-23	01-Feb-25					

Cost Estimate and Expenditure Forecast (Current \$)

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Cost Catagogg	Project	PD/10%	30 %	60%	90%	100%	Bid
Cost Category	Request	Design	Design	Design	Design	Design	Dia
Direct Const.	\$14,645,000	\$34,309,024					
(seg 2,3,4 &7 &	(all segments)						
Priority 1)							
Contingency(Seg	\$2,929,000	\$6,861,805					
2,3,4,7 and Priority 1)							
Greenland WRF Seg 5	\$0	\$1,165,071					
Apex Trail Seg. 4a	\$0	\$161,408					
Greenland Pipe	\$0	\$1,333,352					
Program Seg 6							
SWA	\$0	\$0					
JEA Direct Const.	\$0	\$0					
Project Mgmt							
Engineering							
Prog. Mgmt							
Prj. Support							
Serv.During Const							
Miscellaneous							
Real Estate		_					
Total		<u>-</u>					

Appendix A

Supporting Cost Estimate Information

CONSTRUCTION COST ESTIMATE

Project: SIPS - Greenland - Southside Blvd - Deerwood 3 to Greenland

CIP Cat: Water Distribution

File Name: WS20057-3 102-37 SIPS-Greenland-Southside Blvd-Deerwood 3 to Greenland - W

Cost Index: 11698.80 for February 2021

CP No: 102-37



Project Mgr: Beth DiMeo Estimator: M Spurlock Estimate No: WS20057-3

Rev. No: 3

Date: 3/1/2021

Project Definition

Class 5

DIRECT CONSTRUCTION COSTS

Additional Direct Costs		<u>Material</u>	<u>Labor</u>	<u>Equipment</u>	Other/Sub-Cont.	TOTAL
Additional Direct Costs		Material	Labor	Equipment	Other/Sub-Cont.	TOTAL
Subtotal Contractor Costs		\$0	\$0	\$0	\$43,830,661	\$43,830,661
Contingency (Priority 1 + Segments 2,3,4 & 7 Only)	20%	\$0	\$0	\$0	\$6,861,804.94	\$6,861,805
Subtotal Contractor Cost		\$0	\$0	\$0	\$36,968,856	\$36,968,856
Escalation - Priority 1 + Segments 2,3,4 & 7	6%	\$0	\$0	\$0	\$1,942,020	\$1,942,020
Total From Estimate Details - 30" Raw WM - Segment 6		\$0	\$0	\$0	\$1,333,352	\$1,333,352
Total From Estimate Details - 30" Raw WM - Segment 4a Total From Estimate Details - 30" Raw WM - Segment 5		\$0 \$0	\$0 \$0	\$0 \$0	\$161,408 \$1,165,071	\$161,408 \$1,165,071
Total From Estimate Details - 30" Raw WM - Segments 2,3,4 & 7		\$0	\$0 \$0	\$0	\$29,302,886	\$29,302,886
Total From Estimate Details - Priority 1 Projects		\$0	\$0	\$0	\$3,064,118	\$3,064,118
Contractor Cost		<u>Material</u>	<u>Labor</u>	<u>Equipment</u>	Other/Sub-Cont.	<u>TOTAL</u>

Total Project Costs

Install 52,240 LF of 30in CLDI Water Main from Deerwood III WTP to Greenland WTP Class 5 Accuracy Range -30% to +50%

9:07 AM 1 of 18 3/2/2021

Appendix B

Project Schedule

			FF	2010237	SIPS - Gree	nland -	Southsi	Run Date: 08-N de Blvd - Deerwood 3 to Greenland - W Data Date: 08-N	
tivity ID	Activity Name	Original Duration	Actual Duration	Start	Finish	Start Variance	Finish Variance	2020 2021 2022 2023 2024 2025 2026 CAND LEMAN LANCOUR LEMA	202
FP 2010237 SII	PS - Greenland - Southside Blvd - Deerwood 3 to Greenland - W		2 4. 410			7 01101100	- Variation	110111111111111111111111111111111111111	7111
Milestones	To Globinaria Coatriciao Siva Boornood o to Globinaria IV								
M1	M1 - Project Controls Accepts PSS	0d	0d	22-Jul-20 A		0d	0d	X M1 - Project Controls Accept's PSS	
M2	M2 - Project Scope Signoff Complete	0d	0d	LL dui Lort	22-Jul-20 A	0d	0d	M2 - Project Scape Signoff Complete	
M3	M3 - Start Design	0d	0d	07-Dec-21	22 041 2071	-81d	-81d	♦ wiz 11 logati Scape Signal Complete M3'- Start Design	
MR	MR - Real Estate Acquisition Complete	0d	0d	** =	13-Dec-21	2d	2d	MR - Real Estate Acquisition Complete	
M4	M4 - Design Complete	0d	0d		18-May-23	-76d	-76d	M4 - Design Complete	1 1 1
M6	M6 - Commence Construction	0d	0d	23-Jan-24	, ,	-87d	-87d	♦ M6 - Commerice Construction	
M7	M7 - Construction Substantially Complete	0d	0d		22-Dec-25	-87d	-87d	. ★ M7 - Construction Su	ubstanti
M8	M8 - Construction Complete	0d	0d		01-Feb-26	-88d	-88d	M8 - Construction	1 1 1
M9	M9 - Project Closure Complete	0d	0d		04-Jun-26	-80d	-80d	M9i- Proje	
Scope Definit	ion							· · · · · · · · · · · · · · · · · · ·	
S1000	Setup Footprint	5d	1d	22-Jul-20 A	22-Jul-20 A	0d	0d	Setup Footprint	
TD1000	Time Delay: FY21 Capital Budget Delay	231d	161d		29-Dec-20 A	0d	0d	Time Delay: FY21 Capital Budget Delay	
	, , ,	2010	1010	22-0ui-2074	25-DC0-20 A	ou	- Ou	, inne pejay; rrz i çapıtat buqget belay	
Designer Prod									
RFP Develop		, ,							
DP1005	PM S/A of Phase I for RFP	5d	13d	15-Jan-21 A		0d	-8d	PM S/A of Phase I for R中 PM notified that Zycus Software Rejected Phase 1 Submittal	
DP1191	PM notified that Zycus Software Rejected Phase 1 Submittal	5d	4d		11-Feb-21 A				
DP1192	PM re-submitted Phase 1 Submittal into Zycus	5d	0d	18-Feb-21 A				I PM re-submitted Phase 1 Submittal into Zycus	
DP1193	PM P/S Required RFP Items for Buyer	11d	11d	19-Feb-21 A	06-Mar-21 A	-23d	-29d	•• PM:P/S Required RFP Items for Buyer	
DP1120	Procurement Prepare, Approve and Advertise RFP Package	15d	0d	08-Mar-21 A	26-Mar-21	-29d	-29d	→ Procurement Prepare, Approve and Advertise RFP Package: → Procurement Prepare, Approve and Advertise RFP Package:	
Advertise and	d Bid								
MB1	MB1 - Ad vertise RFP for Design	0d	0d	27-Mar-21		-42d	-42d	MB1 -Advertise.RFP for Design:	
DP1020	Procurement Advertise RFP for Design	60d	0d	27-Mar-21	25-May-21	-42d	-72d	Procurement Advertise RFP for Design	
MB5	MB5 - Open Design Proposals (Tuesday Only)	0d	0d	01-Jun-21		-11d	-11d	MB5 ÷ Open Design Proposals (Tuesday Only)	
DP1040	Designated Graders Review/Score Design Proposals	15d	0d	02-Jun-21	22-Jun-21	-54d	-54d	Designated Graders Review/Score Design Proposals	1 1 1
DP1200	Procurement Review/Score Proposal, Conduct Pre-Eval Meeting, Issue Pt	5d	0d	23-Jun-21	29-Jun-21	-54d	-54d	Procurement Review/Score Proposal, Conduct Pre-Eval Meeting, Issue Public Notice	
DP1050	Procurement Conduct Public Evaluation Meeting	0d	0d	02-Jul-21		-54d	-54d	Procurement Conduct Public Evaluation Meeting	
DP1070	PM Request Cost Proposal and Negotiate with Designer	25d	0d	06-Jul-21	09-Aug-21	-54d	-54d	PM Request Cost Proposal and Negotiate with Designer	
DP1150	PM Request and Receive Post Design Bid Estimate	5d	0d	10-Aug-21	16-Aug-21	-54d	-54d	PM Request and Receive Post Design Bid Estimate	
DP1170	Procurement S/A of Phase II for RFP	5d	0d	17-Aug-21	23-Aug-21	-54d	-54d	Procurement \$/A of Phase II for RFP	1 1 1
DP1160	PM Update PUF and Trend to Post Design Bid Estimate	10d	0d	17-Aug-21	30-Aug-21	-54d	-54d	PM:Update:PUF and Trend to Post Design Bid Estimate	
DP1210	Procurement Request Inclusion on Awards Agenda (Friday by Noon)	1d	0d	27-Aug-21	27-Aug-21	-11d	-11d	Procurement Request Inclusion on Awards Agenda (Friday by Noon)	
Award Desig								· · · · · · · · · · · · · · · · · · ·	
DP1080	Conduct Awards Committee Meeting for Design (Thursday Only)	0d	0d	02-Sep-21		-11d	-11d	⇔ Conduct Awards Committee Meeting for Design (Thursday Only)	
DP1085	OGC Review of Design Contract	20d	0d	02-Sep-21	30-Sep-21	-54d	-54d		
DP1003	Execute Design Contract			02-Sep-21 01-Oct-21	28-Oct-21	-54d			
	<u> </u>	20d	0d				-54d	Execute Design Contract	
DP1095	OGC Review of Executed Design Contract	15d	0d	29-Oct-21	19-Nov-21	-54d	-54d	☐ OGC Review of Executed Design Contract ☐ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □	
DP1100	PM Submit Design Requisition	2d	0d	22-Nov-21	23-Nov-21	-54d	-54d	PM Submit Design Requisition	
DP1110	Procurement Issue Design PO	7d	0d	24-Nov-21	06-Dec-21	-54d	-54d	Pracurement Issue Design PO	
Design and E									
30% Concep									1 1 1
SD1000	Conduct Design Kick-Off Meeting / Request Site Access	1d	0d	07-Dec-21	07-Dec-21	-54d	-54d	Conduct Design Kick-Off Meeting / Request Site Access	
CD1000	Designer Perform 30% Design	125d	0d	07-Dec-21	07-Jun-22	-54d	-54d	Designer Perform 30% Design	1 1 1
CD1010	30% Design Submittal from Designer	0d	0d		07-Jun-22	-54d	-54d		
CD1020	JEA Revie w 30% Design	15d	0d	08-Jun-22	28-Jun-22	-54d	-54d	. ⇒ JEA Review 30% Design	1 1 1
CD1030	Conduct 30% Design Review Meeting	1d	0d	29-Jun-22	29-Jun-22	-54d	-54d	Conduct 30% Design; Review Meeting	1 1 1
30% Checkpo									
M30	M30 - 30% Design Checkpoint and Trend Submitted	0d	0d	30-Jun-22	<u> </u>	-54d	-54d	M30 -30% Design Checkpoint and Trend Submitted	
Remai	ning Level of Effort Actual Work Critical Remain	ning Work					Pane	1 of 3 TASK filters: Do Not Show LOE, Do Not Show WBS Summaries.	
	Level of Effort Remaining Work Time Delay						ı ayı	1.51.5 TAOK IIILE13. DO NOLOTIOW LOL, DO NOLOTIOW WIDS SUITINIAITES.	
Actual	Level of Lifett								

			FI	P 2010237	SIPS - Gree	enland -	Southside	e Bl	vd - Deerwood 3 to	Greenland -	w									Date: 08 Date: 08	
ity ID	Activity Name	Original	Actual	Start	Finish	Start	Finish		2020	2021	20)22	2023		2024		2025			2026	
	·	Duration	Duration			Variance	Variance 3	۷DJ	IFMANJJAS DVDJFN	AMJJASON:	J = M A M J	JASJVDJ	FMAMJJAS	ONDJEVIAV	JJASONE	DJFMA	MJJA	SOND	J = M A	/JJAS:	DVC
CD1040	S/A OF 30 % Checkpoint and Trend	10d	0d	30-Jun-22	14-Jul-22	-54d	-54d					S/A OF 30	6 Checkpoint a	nd Trend						1.1.1.1.1	
60% Design																					
D6010	Designer Perform 60% Design	80d	0d	30-Jun-22	21-Oct-22	-54d	-54d					Desi	gner Perform 60	% Design							
D6020	60% Design Submittal from Designer	0d	0d		21-Oct-22	-54d	-54d					♦ ◆ 60%	Design Submitt	al from Designe	riiiiii						
D6030	JEA Review 60% Design and Submit Comments to Designer	5d	0d	24-Oct-22	28-Oct-22	-54d	-54d					• JEA	Review 60% De	sign and Subm	t Comments	to Desig	ner				
D6035	Conduct 60% Design Review Meeting	1d	0d	31-Oct-22	31-Oct-22	-54d	-54d					Con	duct 60% Desig	n Review Meeti	ng 🔡 🔛						
90% Design																					
D9010	Designer Perform 90% Design	80d	0d	24-Oct-22	22-Feb-23	-54d	-54d						Designer Pe	rform 90% Desi	gn i i i i						
D9020	90% Design Submittal from Designer	0d	0d		22-Feb-23	-54d	-54d						• 90% Design	Submittal from	Designer						
D9030	JEA Review 90% Design	10d	0d	23-Feb-23	08-Mar-23	-54d	-54d						JEA Reviev	/90% Design							
D9050	Conduct 90% Design Review Meeting	1d	0d	09-Mar-23	09-Mar-23	-54d	-54d						Conduct 90)% Design Revi	w Meeting						
100% Design				<u>'</u>							1 1 1 1 1 1								• - • - - 		
D1000	Designer Perform 100% Design	40d	0d	10-Mar-23	04-May-23	-54d	-54d					: : : : : : : :	Design	er Perform 100%	Design						
D1010	100% Design Submittal from Designer	0d	0d		04-May-23	-54d	-54d							esign Submittal		er					
D1020	JEA Review 100% Design and Provide Comments	5d	0d	05-May-23	11-May-23	-54d	-54d							view 100 % Des			ments:				
D1040	Designer P/S 100% Final Documents	5d	0d	12-May-23	18-May-23	-54d	-54d							er P/S 100% Fir	•						
100% Checkpoint								 			7-7-1-1-1-		++++++++				1-1-1-7-7				
M100	M100 - 100% Design Checkpoint and Trend Submitted	0d	0d	19-May-23		-54d	-54d							100% Design (Submitt	ed			
D1050	S/A of 100% Checkpoint and Trend	10d	0d	19-May-23	02-Jun-23	-54d	-54d						■ S/A o	f 100% Checkpo	int and Trend	di i i i					
Permitting																					
SJRWMD																					
P1005	P/S SJRWMD Permit Application	25d	0d	23-Feb-23	29-Mar-23	-54d	-54d	:-:-:-					P/S SJRV	/MD Permit App	lication						
P1015	SJRWMD R/A Permit Application	30d	0d	30-Mar-23	10-May-23	-54d	-54d							MD R/A Permit A				, , , , ,			
P1035	Receive SJRWMD Permit	0d	0d		10-May-23	-54d	-54d							e SJRWMD Per							
DEP and Environ	mental												Y : : : : : : : :								
P1110	P/S FDEP Permit Application	25d	0d	23-Feb-23	29-Mar-23	-54d	-54d						P/S FDFF	Permit Applicat	on						
P1180	FDEP R/A Permit Application	30d	0d	30-Mar-23	10-May-23	-54d	-54d	- 4 - 4 -						R/A Permit Appli			1-1-1-1				111
P1100	Receive FDEP Permit	0d	0d		10-May-23	-54d	-54d						♠ Receiv								
FDOT					,								•								
P1170	P/S FDOT Permit Application	25d	0d	23-Feb-23	29-Mar-23	-54d	-54d					:	P/S FDOT	Permit Applicat	oh						
P1020	FDOT R/A Permit Application	30d	0d	30-Mar-23	10-May-23	-54d	-54d							R/A Permit Applicat							
P1150	Receive FDOT Permit	Od	0d	OO MIGI 20	10-May-23	-54d	-54d						Receiv		Jauon		1-1-1-1-1			1-1-1-1-1-	++-
COJ	Tresserve I Ber F entitle	ou	- Gu		To May 20	O Id	o iu						• Itecelv					, , , , ,			
P1160	P/S COJ ROW Application	25d	0d	23-Feb-23	29-Mar-23	-54d	-54d						DIC: CO.L.	ROW Application							
P1120	COJ R/A ROW Application	30d	0d	30-Mar-23	10-May-23	-54d	-54d							AROW Application							
P1130	Receive COJ ROW Approval	0d	0d	30-Wai-23	10-May-23	-54d	-54d							e COJ ROW Ap							
FWC	Traceive God Trovy Apploval	Uu	ou		10-iviay-23	-54u	-J4u						◆ Kecelv	S COUROW AP	JIO VIAII.					1-1-1-1-1-	
P1200	D/S DMC Domit Application	254	0d	23-Feb-23	29-Mar-23	-54d	E44						Dio divio	Dame to A							
	P/S FWC Permit Application	25d				-	-54d							Permit Applicati							
P1210 P1220	FWC R/A Permit Application Receive FWC Permit	30d 0d	0d	30-Mar-23	10-May-23	-54d -54d	-54d							A Pelmit Applic	ation						
	IVECTIVE LANC LETTING	Ud	0d		10-May-23	-540	-54d						♦ Receiv	e rvv C Permit							
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P1230	P/S ACOE Permit Application	25d	0d	23-Feb-23	29-Mar-23	-54d	-54d							Permit Applica							
P1240	ACOE R/A Permit Application	30d	0d	30-Mar-23	10-May-23	-54d	-54d							R/A Permit Appl	cation						1 1 1
P1250	Receive ACOE Permit	0d	0d		10-May-23	-54d	-54d						Receiv	e ACOE Permit							
Real Estate																					
R1010	Real Estate Acquisition	5d	0d	07-Dec-21	13-Dec-21	-54d	2d	- - -			Real Estat	e Acquisition									ا ا
Construction Prod	curement																				
Bid Package Prep	paration																				
B2020	PM S/A of Phase I for IFB	5d	0d	05-Jun-23	09-Jun-23	-54d	-54d						PM S	/A of Phase I fo	· IFB						
B2330	PM Prepare Required IFB Items for Buyer	5d	0d	05-Jun-23	09-Jun-23	-54d	-54d						• PM F	repare Required	I IFB Items fo	or Buyer					
Remaining I		tical Remaining Work	(Page 2	2 of 3	3		Т	ASK filters:		LOE, Do Not			aries.				

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MB3	Procurement Conduct Prebid Meeting	1d	0d	18-Jul-23	18-Jul-23	-54d	-54d		1 1 1 1 1 1					Procur	ement Conduc	ct Prebid	Meeting	* - - 	1 1 1 1 1 1		
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B2190 PM Update Project B2180 Procurement S/A o VP10 PM P/S Vendor Pe B2220 PM Update PUF a B2225 Procurement Requ Award B2235 B2235 OGC Review of Co B2235 OGC Review of Ex B2250 Procurement Exect B2255 OGC Review of Ex B2265 PM Submit Requis B2290 PM Compile and R B2310 Hold Pre-Construct Construction C1020 C1020 Perform Constructi VP20 PM P/S Vendor Pe C1022 PM Notify JEA Inte Punchlist C1000 C1030 Conduct Punchlist C1610 JEA R/A Punchlist C1030 Contractor Perform Contract Closeout As Builts C1070 Contractor P/S Final C1080 Contractor P/S Final C1000 JEA R/A Final As-B Final Invoice Contractor P/S Final C1000 PM P/S Fi	PM Perform Construction Bid Analysis	1d	0d	05-Sep-23	05-Sep-23	-53d	-53d						, i		Perform Cons						
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VP10 PM P/S Vendor Pe B2220 PM Update PUF a B2225 Procurement Requ Award B2230 Conduct Awards Conduct	Procurement S/A of Phase II for IFB (Dir by Thursday, VP by Monday)	4d	0d	06-Sep-23	11-Sep-23	-53d	-53d							1 1-1 1	curement S/A				lov VP by	Abaday)	
B2220	PM P/S Vendor Performance on Designer	5d	0d	06-Sep-23	12-Sep-23	-53d	-53d								P/S Vendor P		1 1 1 1 1 1		lay, v.r. by i	ionuay)	
B2225	PM Update PUF and Trend to Post Bid Estimate	10d	0d	06-Sep-23	19-Sep-23	-53d	-53d								1 Update PUF						
B2230 Conduct Awards Conduct Conduct Conduct Conduct Construction	Procurement Request Inclusion on Awards Agenda (Friday by Noon)	1d	0d	15-Sep-23	15-Sep-23	-11d	-11d						7		1 1 1 1 1 1 1						
B2230 Conduct Awards Cr.	Procurement Nequest inclusion on Awards Agenda (Fiday by Noon)	Id	ou	10-0ep-20	13-3ер-23	-11d	-110							; ; ; Pro	curement Rec	quest inc	iusion on Awa	ards: Agend	a (Finday by	NOON)	
B2235 OGC Review of Cot			0.1	04.0		44.1	44.1														
B2250	Conduct Awards Committee Meeting for Construction (Thursday Only)	0d	0d	21-Sep-23	40.04.00	-11d	-11d						•		onduct Awards				ction (Thurs	lay Only	
B2255 OGC Review of Ex B2265 PM Submit Requis B2290 PM Compile and R B2320 Procurement Issue B2310 Hold Pre-Construct Construction C1020 Perform Construction VP20 PM P/S Vendor Pe C1022 PM Notify JEA Inte Punchlist C1600 Conduct Punchlist C1610 JEA R/A Punchlist C1030 Contractor Perform Contract Closeout As Builts C1070 Contractor P/S Final C1090 JEA R/A Final As-B Final Invoice C1080 Contractor P/S Final C1100 JEA R/A Final Pay Vendor Performance VP30 PM P/S Final Vend VP40 PM P/S Final Vend Project Closeout C1560 PM Perform Close	OGC Review of Construction Contract	20d	0d	21-Sep-23	18-Oct-23	-54d	-54d						•		OGC Review o		The state of the state of				
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Appendix C

Priority 1 Project Scope Statement

Project Scoping Document -SIPS Greenland WTP Priority 1 Project

Project Name:	SIPS Greenland WTP Priority 1 Project
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Revision H	Revision History [add rows as needed]												
Version	Date	Author	Comments										
1.0	9/28/2020	Larry Gunn											
2.0	2/8/21	Elizabeth DiMeo	Deleted scope items that will not be included in CP102-37.										

Project Scope

Following the completion of the Total Water Management Plan (TWMP) in 2014, the planned Southside Integrated Piping System (SIPS) will convey water from JEA's North Grid Main St. Water Treatment Plant (WTP) to multiple South Grid WTPs. The current TWMP system can only deliver water to the northern part of the South Grid and is not capable of delivering water to the rapidly growing southern portion of the South Grid. The SIPS project will deliver water directly to South Grid WTPs, including those in the center and southern areas of the Grid, for final treatment and delivery to customers. Water supplied through SIPS will supplement each WTP's local wellfield supply and enable JEA to limit wellfield withdrawals to their permitted annual limits.

One of the first SIPS construction projects is the SIPS Greenland WTP Pipeline project running from the SIPS Deerwood WTP Pipeline to the Greenland WTP. The SIPS Greenland WTP Priority projects described in this Project Scoping Statement (PSS) includes the other facilities needed to create and support a fully functional water delivery system to the Greenland WTP. These improvements were first identified in the 2018 iWATER Master plan and are described in the Technical Memorandum (TM) titled *Activity 3: Integrate iWATER Program Recommendations into SIPS (Jacobs, 2020a).*

This SIPS Greenland WTP Priority projects included in this PSS are as follows:

- 1. Engineering Evaluation of 2040 Greenland WTP Capacity Scope Not included in 102-37 Greenland SIPS
- 2. Water Quality Monitoring Stations

project

- 3. Greenland WTP SIPS Intertie Station
- 4. Supervisory Control and Data Acquisition (SCADA) System
- Greenland WTP Ground Storage Tank
- 6. Replacement of High Service Pumps Scope not included in 102-37: Greenland SIPS project

Engineering Evaluation of 2040 Greenland WTP Capacity

In the iWater report, the 2040 projected peak hour demand is approximately 21.4 mgd. The Greenland WTP has two 1,000 gpm and three (two existing and one in construction) 2,000 gpm high service pumps that will have a firm capacity of 6,000 gpm (8.6 mgd) and a total capacity of 8,000 gpm (11.5 mgd). Therefore, the high service pumps require replacement to meet the projected peak hour demands. Additionally, the increase in demand will require overall improvements to the Greenland WTP, such as expansions to storage, sodium hypochlorite storage and feed, and discharge mains.

Due to the significant increase in capacity required at the Greenland WTP high service pumps, all of the associated WTP improvements required for the 2040 condition cannot be determined at this time. Therefore, an engineering evaluation is required during the design phase to determine the following:

- 1) Firm and total high service pumping capacity for Priority 1 and Priority 2 projects
 - a. In this Priority 1 project scoping document, the two 1,000 gpm pumps are assumed to be upsized to 3,700 gpm pumps. The firm capacity of the high service pumps will then increase from 8.6 mgd to 14.0 mgd. This increase in high service pumping capacity along with the tank included in this Priority 1 project will provide JEA an interim increase in WTP capacity.
 - b. To meet the 2040 projected peak hour demand, the remaining three pumps are assumed to be upsized to 3,700 gpm each. This pump upgrade as well as other WTP upgrades needed to meet the 2040 condition will be carried out as part of a Priority 2 project.
 - c. The engineering evaluation will include assessing JEA's 2025, 2030, and 2040 projections and the iWater projections for the Greenland WTP to validate the pump capacities prior to beginning detailed design.
- 2) Improvements to the WTP
 - a. This Priority 1 project includes addition of a 1.1 MG (1.0 MG usable volume) storage tank. The engineering evaluation shall determine if additional storage is needed in the Priority 2 project to meet the projected 2040 demands.
 - b. For the Priority 1 project described in this PSS, it is assumed that the existing sodium hypochlorite storage and feed system can accommodate the increased flows. However, this assumption will need to be verified in this evaluation. The engineering evaluation shall also determine the necessary upgrades to the existing sodium hypochlorite storage and feed system to accommodate the 2040 condition WTP capacity for the Priority 2 project.
 - c. The Priority 1 project has made assumptions detailed below regarding electrical improvements that need to be verified in this evaluation. Additionally, the evaluation shall determine the necessary electrical improvements for the Priority 2 project.
- 3) Impacts of increasing the pumping capacity to meet 2040 projected demands have on the pump suction and discharge piping
 - a. This project scoping document includes upgrades to the individual pump suction and discharge piping for the two pumps to be replaced as part of the Priority 1 project. The evaluation shall validate that no other piping improvements are required for the Priority 1 project.
 - b. The projected 2040 peak hour demand of 21.4 mgd will exceed the capacity of the 24-inch discharge header and discharge main that leaves the high service pump station. It is possible that a parallel main will need to be constructed, and the discharge header in the high service pump station may require replacement. The projected demands also result in a high velocity in the pump suction piping; however, they do not exceed the Hydraulic Institute Standards maximum velocity of 8 fps. Due to the uncertainty of the necessary discharge and suction piping improvements to meet the 2040 demands, an engineering evaluation shall be performed to determine what piping improvements are required to meet the 2040 projected demands for the Priority 2 project.

Water Quality Monitoring Stations

A water quality monitoring station will be installed at the Greenland WTP to enable water quality monitoring for biomass growth, bacteria growth, and/or taste and odor development.

The design of the SIPS Water Quality Monitoring Station is anticipated to include the following:

- A removable coupon assembly to monitor for biomass growth on interior surfaces of the pipeline will be included at the Greenland WTP SIPS Intertie Station. The assembly will be manufactured by Metal Samples Company, Model RT4000 or similar.
- Permanent sample taps will be provided in the SIPS Greenland WTP Pipeline project for manual sampling.

Greenland WTP SIPS Intertie Station

A new SIPS Intertie Station will connect the SIPS Greenland WTP Pipeline to the Greenland WTP (see Figure 1). Work on the new intertie station is expected to take place within the boundaries of the WTP site; therefore, additional real estate will not need to be acquired.

The design and construction of the new SIPS Intertie Station is anticipated to consist of the following:

- 30-inch yard piping to connect the 30-inch SIPS Greenland WTP Pipeline to the new Greenland WTP Intertie Station.
- Intertie Station consisting of the following:
 - o 24-inch flow meter
 - o 24-inch flow control valve
 - 24-inch Intertie Station bypass
 - 24-inch surge relief valve
 - Piping, valves, and associated appurtenances
 - o Electrical and SCADA equipment
 - o Concrete equipment pad
- 30-inch yard piping from the Intertie Station to the existing 1 million-gallon (MG) ground storage tank and a new 1.1 MG ground storage tank with isolation valves to each.
- SIPS fill line connections to the existing and new ground storage tanks. The tank connections are anticipated to be similar to the existing Arlington WTP TWMP fill line connection and include the following:
 - 30-inch ductile iron standpipe pipe external to the tank supported primarily off the external grade with stabilization support off the side and top of the tank wall
 - 30-inch tank dome penetration
- The surge relief valve was evaluated as part of the TM titled *JEA Southside Integrated Pipeline System Subprogram Surge Analysis (Jacobs, 2020b)*. The design shall include verification of the need for the surge relief valve for redundancy purposes.
- Pressure piping located will be restrained-joint cement lined ductile iron (CLDI) pipe per *Section* 350 Potable Water Piping in the JEA Water & Wastewater Standards Manual.
- Isolation valves shall be resilient seat gate valves per *Section 351 Water Valves & Appurtenances* in the JEA Water & Wastewater Standards Manual.

SCADA Design Integration

SCADA will control delivery of water from the SIPS pipeline to supplement the local wellfield supply and maintain CUP compliance. The following facilities will require SCADA control and monitoring from the Ridenour WTP Control Room:

- SIPS Intertie Stations
- Main Street WTP High Service Pump Station
- Arlington Booster Pump Station

The SIPS Deerwood WTP Intertie Station, Main Street WTP, and Arlington Booster Pump Station SCADA control and monitoring improvements are anticipated to be implemented with the SIPS Deerwood III WTP Priority 1 project, therefore this Priority 1 project will only include the SCADA design necessary at the SIPS Greenland WTP Intertie Station. The overall control strategy and framework will be developed as part of the SIPS Deerwood III WTP Priority 1 project.

The following major instrumentation and controls (I&C) components and services are anticipated for integration of the SIPS Greenland WTP Intertie Station with the existing control system infrastructure:

- Electromagnetic flowmeter and interface
- Remote Input/Output (RIO) panel
- Hardware Siemens per current JEA standards
- Uninterruptible power supply
- Fiber-optic cabling for interfacing the proposed RIO with the existing WTP control network

JEA will perform the programming required to integrate these new components into their existing control network at the Deerwood III WTP and at the Ridenour Control Room.

For cost estimating purposes, the anticipated SCADA components required for the SIPS Greenland WTP Intertie Station were accounted for in an allowance of \$50,000.

Greenland WTP Ground Storage Tank

The need for a new ground storage tank at the Greenland WTP was identified as a SIPS Greenland WTP Priority project in the TM titled *Activity 3: Integrate iWATER Program Recommendations into SIPS (Jacobs, 2020).* JEA elected to size the new third storage tank at 1.1 MG to match the planned second 1.1 MG storage tank that is currently under construction. The usable volume of the new storage tank should be no less than 1.0 MG. The design and construction of the new Greenland WTP ground storage tank is anticipated to consist of the following:

- A 1.1 MG prestressed concrete ground storage tank designed to AWWA D110 and ACI 372 standards
 - Tank Dimensions: Diameter should not exceed 80 feet with a side wall depth of 30.33 feet.
- Tank Piping Connections:
 - 30-inch SIPS water fill (dome penetration)
 - 24-inch raw water fill (floor penetration) with internal standpipe to the tray aerator on the dome of the tank. The tray aerator piping discharge elevation should match the existing ground storage tank discharge elevations.
 - 30-inch tank discharge (floor penetration) with fiberglass vortex breaker
 - o Tank overflow (floor penetration) with internal standpipe
 - Tank drain line to three recessed floor penetrations
- Tray Aerators for Sulfide Removal: Fiberglass tray aerator rated at 15 gpm/square foot, with seven trays and a minimum 12-inch separation.
- Ventilation Fans: Four aluminum vane axial, forced-draft ventilation fans. The fans will provide one air change per minute for the air volume above the high-water level in the tank.
- Level Controls: Submersible pressure transducer and level alarm switches.

- Emergency Overflows: A minimum of eight emergency overflows on the dome.
- Handrail: Aluminum handrail around the tank perimeter.
- Stairs: Exterior aluminum stairs with aluminum railing and landing.
- Ladder: Interior ladder constructed from fiberglass, reinforced plastic and safety-climb device.
- Baffles: Interior polypropylene baffle curtains.
- All interior surfaces of the tank and pipes will be coated with NSF 61 certified paint systems. The tanks will be coated per JEA's latest standard concrete storage tank coating systems.

The design and construction of the new Greenland WTP ground storage tank is also anticipated to consist of the following supporting work:

- Yard piping: The anticipated yard piping is shown in Figure 1.
 - All new pressure piping located on the WTP site shall be restrained-joint cement lined ductile iron (CLDI) pipe per Section 350 – Potable Water Piping in the JEA Water & Wastewater Standards Manual.
 - All new isolation valves shall be resilient seat gate valves per Section 351 Water Valves
 & Appurtenances in the JEA Water & Wastewater Standards Manual.
- A hydraulic evaluation of the existing and proposed water mains from the ground storage tanks
 to the high service pumps should be performed during the design phase with a goal of providing
 similar flow from the tanks when operated in parallel and series.
- Clear and grade the existing JEA WTP site as needed to construct the new 1.1 MG storage tank and associated yard piping.
- Remove and replace existing security fence along the JEA property lines as shown in Figure 1.
 Provide a new security gate along the north side of the new 1.1 MG storage tank and WTP Intertie Station.
- Evaluation of the existing WTP electrical systems (primary and backup) to accommodate the additional electrical loads associated with the storage tank.
- Electrical and instrumentation and controls associated with the 1.1-MG ground storage tank and connection to the WTP Intertie Station.
- Evaluation of the existing stormwater management system for the new WTP improvements. Stormwater management system improvements are not anticipated however will be as needed to meet the requirements of the Environmental Resource Permit (ERP)

Replacement of High Service Pumps

In the Priority 1 project, it is anticipated that the two existing 1,000 gpm high service pumps will be replaced with two 3,700 gpm pumps, which will be verified by the engineering evaluation during the design phase. It is assumed that the firm capacity of the high service pump station after completion of the Priority 1 and Priority 2 projects will be 20.6 mgd to meet the projected 2040 peak hour demand. The design and construction of the replacement of the two high service pumps is anticipated to consist of the following, also to be verified in the engineering evaluation:

- Remove two existing 1,000 gpm high service pumps and associated pipe and fittings (see Figure 2).
- Construct two 3,700 gpm @ 185' TDH horizontal split case pumps. The pumps are assumed to require 250 HP motors.
- Replace existing 16-inch suction piping and supports with 20-inch suction piping, fittings, and pipe supports.

- Replace existing 12-inch discharge piping and supports with 16-inch discharge piping, fittings, rubber flapper check valve, and pipe supports.
- Two new breakers to be installed in existing switchgear.
- Two new adjustable frequency drives (AFDs).
- Replace existing safety switches and feeders as required.
- Replace trip plug of main service entrance breaker
- Replace the existing generator with one suitable for the future WTP electrical load identified in the engineering evaluation.
- Assume that existing pad mounted transformer capacity is sufficient.

Survey, Subsurface Utility Engineering (SUE), and Geotechnical Investigation

Survey of the Greenland WTP Priority 1 project area will be required for the design. The following areas, at a minimum, will be surveyed:

- Existing property/easement/right-of-way lines.
- Proposed staging areas.
- Surveyor to identify above-ground and below-ground utilities.
 - Ground-penetrating radar should be used to map all subsurface utilities, piping, and appurtenances for the proposed tie-in. Unidentified utilities could result in a significant change order.
 - SUE investigation is required to locate existing utilities within the project boundaries.
 Specifically, test holes should be obtained where the proposed piping crosses existing utilities.
- Geotechnical borings will be required to for the new 1.1 MG ground storage tank and Intertie Station concrete pad.

Delivery Method

This project will be delivered by design-bid-build delivery.

Reliability, Redundancy, and Resiliency

A project request will be submitted during design to JEA's Asset Management group for resiliency evaluation.

Land Ownership/Real Estate Issues

This project is limited to JEA property; therefore, real estate acquisitions or involvement is not expected. This project consists of improvements to a fully permitted, existing WTP facility.

Permitting

The following permits are anticipated to be required on this project:

- Florida Department of Environmental Protection (FDEP) PWS Construction Permit
- City of Jacksonville 10-Set Permit
- FDEP ERP permitting to determine stormwater management and endangered species requirements. No wetland impacts are anticipated in this project.

Risk Issues and Assumption

The following risks have been identified:

 Congested underground infrastructure is anticipated at the WTP site and should be investigated further during the design phase

- Completion of the following components included in this PSS are required to be operational in order to place the SIPS Greenland WTP pipeline in service:
 - Water Quality Monitoring Stations
 - o Greenland WTP SIPS Intertie Station
 - o Supervisory Control and Data Acquisition (SCADA) System

Project Cost

The estimated project costs are included in the tables below. The direct construction costs represent AACE International Class 5 construction cost estimates. See Attachment A for a detailed breakdown of the pre-escalation construction costs.

The following assumptions were made for the non-construction costs:

- Contingency = 25 percent of direct construction
- JEA Project Management = 3 percent of direct construction, including contingency
- JEA Project Support = 2.5 percent of direct construction, including contingency
- JEA Services During Construction = 5 percent of direct construction, including contingency
- Engineering = 12 percent of direct construction, including contingency

Direct Construction Breakdown

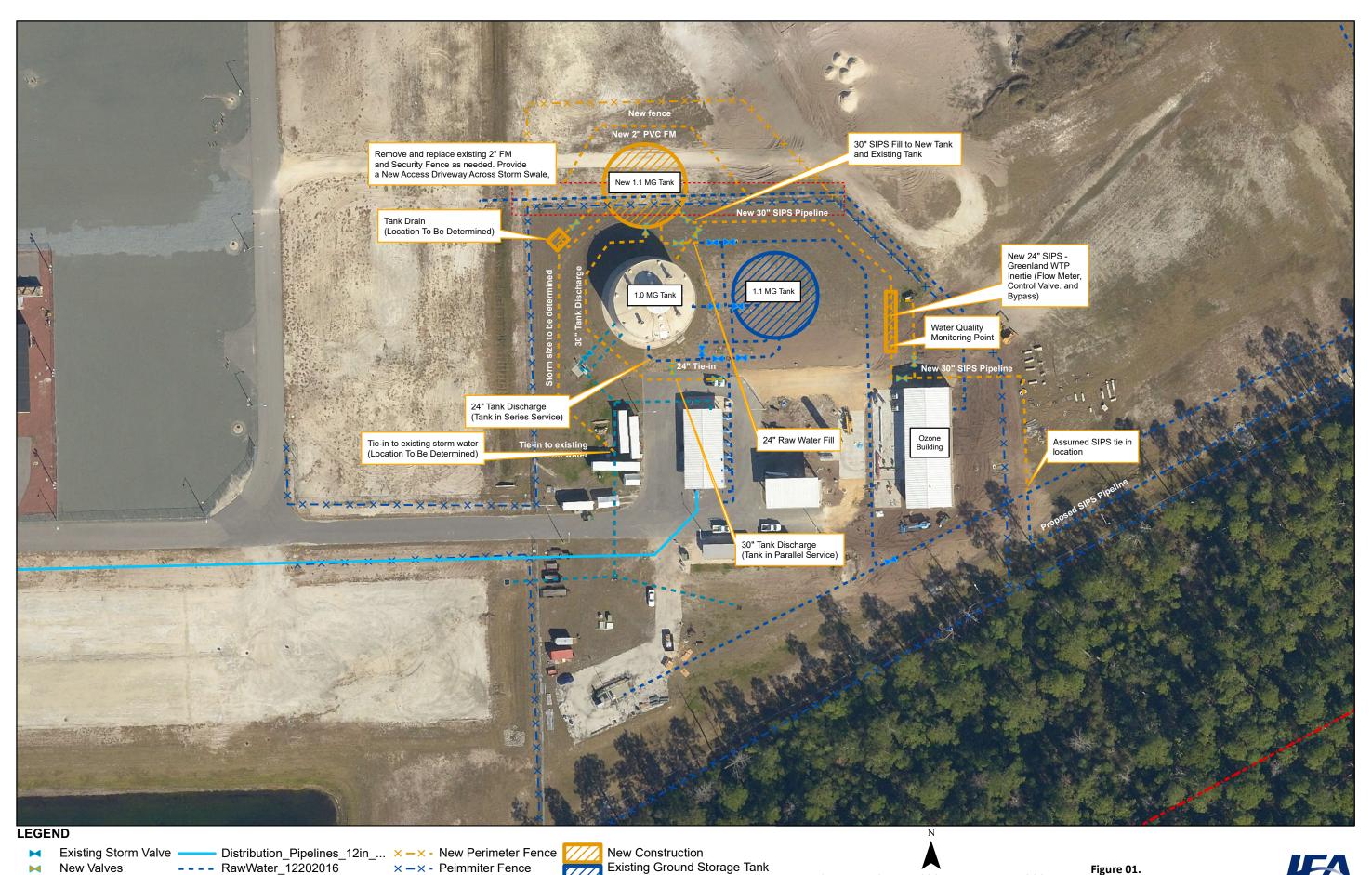
The costs below total the direct construction costs for the SIPS Greenland WTP Priority 1 project elements (AACE International Class 5).

Item	Description	Cost	
01	Water Quality Monitoring Station	\$2,532	
02	Greenland WTP SIPS Intertie Station	\$517,400	
03	Supervisory Control and Data Acquisition (SCADA) Design Integration	\$62,567	
04	Greenland WTP Ground Storage Tank	\$2,481,617	
05	Replacement of High Service Pumps	\$488,603	
	Direct Construction Sub-Total	\$3,552,719	\$3,064,116
	6% Escalation	\$213,000	\$183,847
	Direct Construction Total	\$3,766,000	\$3,247,963

Project Cost

The costs presented in the following table reflect the JEA project costs for the SIPS Greenland WWTP Priority 1 project.

Cost Category	Project Request	10% Design	30% Design	60% Design	90% Design	100% Design	Bid
Direct Construction	\$ 3,766,000 \$	3,247,963					
Contingency	\$942,000 \$ 8	11,991					
SWA	\$0						
JEA Direct Construction	\$0						
JEA Project Management	\$141,000 \$9	7,439					
Engineering	\$565,000 \$3	89,756					
JEA Services During Construction	\$235,000 \$16	2,398					
JEA Project Support	\$118,000 \$8 ²	1,199					
Real Estate	\$0						
Total	\$ 5,767,000 \$	479,0746					



JEA_Greenland_Parcel_Bo...

Last Updated: DRAFT20200909 Greenland_WTP_PSS5

Distribution Valves --- Existing Storm Water

Greenland_WTP_PSS5
Source Data: FDOT APLUS 2016, Florida Geographic Library, Google Earth, JEA, ESRI, Duval County, Florida Division Emergency Management

--- New Pipeline

200

100

Feet

50

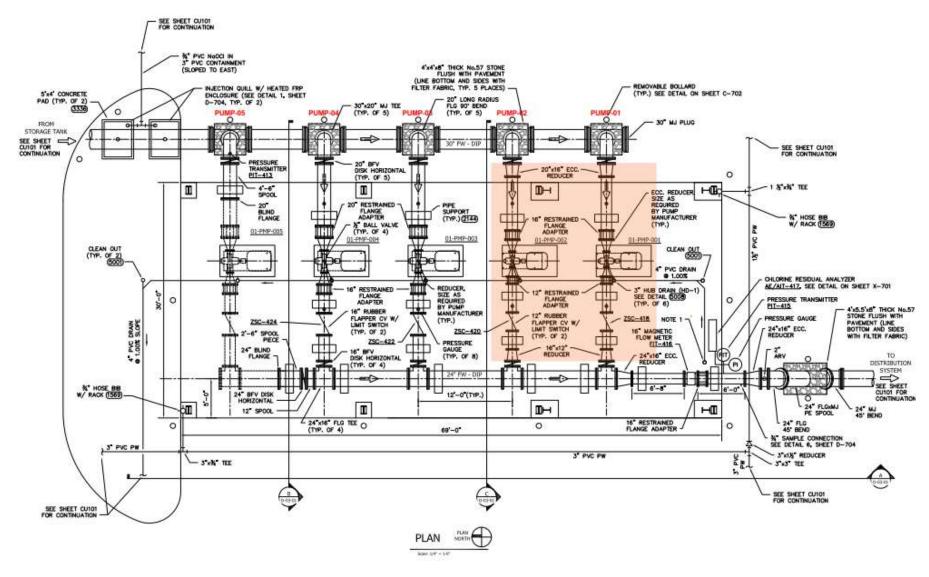


Figure 2 Conceptual High Service Pump 1 and 2 Replacement

Attachment A

WorkActiv	·	Takeoff Quantity	Labor Cost/Unit	Labor Amount Ma	ateriai Cost/Unit	Material Amount S	oub Cost/Unit	Sub Amount E	quip Cost/Unit	Equip Amount T	otal Cost/Unit	Tota
	Water Quality Monitoring Station											
33.03.30	0.SIPS 30" SIPS Intertie Above Grade Mechanical											
	Permanent Sample tap with removabal coupon assembly (need pricing)	1.00 ea	22.84 /ea	23	2,132.03 /ea	2,132					2,154.87 /ea	
	Strap at conc. support, CS, 30"	1.00 ea	57.13 /ea	57	319.80 /ea	320					376.93 /ea	
	33.03.30.SIPS 30" SIPS Intertie Above Grade Mechanical			80		2,452						
	01 Water Quality Monitoring Station	1.00 LS	79.97 /LS	80	2,451.83 /LS	2,452	/LS		/LS		2,531.80 /LS	i
	Greenland WTP SIPS Intertie Station	=5			_,	_,					_,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
33 01 30 9	SIPS I 30" SIPS - Greenland SIPS to Intertie (Includes Bypass)											
00.01.00.0	CMPCTION Water (Check Mainline Crew for Water TK, Tank & Operator) Update Wtr \$	3,800.00 gal			0.01 /gal	38					0.01 /gal	
	30" pipe, DI, RJ, excav/bkfill included, 250#	380.00 LF	32.60 /LF	40.000		80,622			37.70 /LF	14,325		
				12,386	212.16 /LF						282.46 /LF	
	30" DI, RJ, EII, 90	5.00 ea	350.39 /ea	1,752	5,457.97 /ea	27,290			405.24 /ea	2,026	6,213.60 /ea	
	30" DI, RJ, tee	2.00 ea	525.59 /ea	1,051	5,685.39 /ea	11,371			607.85 /ea	1,216	6,818.83 /ea	
	Megalugs for DI Pipe w/ Accessories, 30"	4.00 ea	116.41 /ea	466	2,110.96 /ea	8,444			104.71 /ea	419	2,332.08 /ea	
	Polywrap, 30" pipe	380.00 lf			1.88 /lf	713					1.88 /lf	
	Add for tie-in to existing (Adjust productivity)	1.00 ea	1,629.74 /ea	1,630	1,066.00 /ea	1,066			1,884.83 /ea	1,885	4,580.57 /ea	
	Pipe Marking, ID Tape	380.00 lf	0.60 /lf	228	0.19 /lf	70					0.78 /lf	
	Install gate valve, MJ, 30"	2.00 ea	535.48 /ea	1,071					481.67 /ea	963	1,017.15 /ea	
	Gate valve, iron body, solid wedge, MJ, 150#, NO, 30"	2.00 ea			58,630.55 /ea	117,261					58,630.55 /ea	
	CI Valve Box & Cover, w/ Concrete Collar included	2.00 ea	174.61 /ea	349	213.21 /ea	426			157.06 /ea	314	544.88 /ea	
	30" Water Fill Pipe to Existing Tank	1.00 ls	174.01 /ca	545	210.21 /64	420	62,567.33 /ls	62,567	137.00 /64	314	62,567.33 /ls	
	· · · · · · · · · · · · · · · · · · ·	1:00 IS		40.000	n =	0.47.004				04.440		
	33.01.30.SIPS I 30" SIPS - Greenland SIPS to Intertie (Includes Bypass)		/LF	18,933	/LF	247,301	/LF	62,567	/LF	21,148	/LF	
33.03.30.ln	Intertie Intertie Above Grade Mechanical											
	Paint process pipe and fittings, subcontracted, priced per LF, 30" dia.	50.00 If					48.65 /lf	2,432			48.65 /lf	
	Install 30" DI, flanged, spool <= 10'	3.00 ea	862.03 /ea	2,586							862.03 /ea	
	Install 30" DI, flanged, spool > 10'	2.00 ea	1,077.39 /ea	2,155							1,077.39 /ea	
	24" Fabricated DI Spool, FxF, 7' 6" - FURNISH	1.00 ea			8,650.31 /ea	8,650					8,650.31 /ea	
	30" Fabricated DI Spool, FxF, 12' 6" - FURNISH	2.00 ea			12,250.59 /ea	24,501					12,250.59 /ea	
	30" Fabricated DI Spool, FxRJPE, 6' 0" - FURNISH	2.00 ea			9,238.75 /ea	18,478					9,238.75 /ea	
	30" DI, FL, EII, 90	2.00 ea	862.03 /ea	1,724	8,227.82 /ea	16,456					9,089.84 /ea	
	30" DI, FL, reducer, 30" x 24"	2.00 ea	862.03 /ea	1,724	3,771.90 /ea	7,544					4,633.93 /ea	
				805							•	
	30" DI, flanged coupling adapter	1.00 ea	805.47 /ea	805	938.09 /ea	938					1,743.56 /ea	
	Add for boss and 1" tap in pipe, 14"-36" pipe	1.00 ea			319.80 /ea	320					319.80 /ea	
	Ball valve, bronze, screwed, 1" with plug	2.00 ea	22.86 /ea	46	71.07 /ea	142					93.92 /ea	
	Strap at conc. support, CS, 30"	2.00 ea	57.13 /ea	114	319.80 /ea	640					376.93 /ea	
	Strap at conc. support, CS, 24"	2.00 ea	57.13 /ea	114	319.80 /ea	640					376.93 /ea	
	24" Bolt & Gasket Kits, CS, 150#	6.00 ea	262.78 /ea	1,577	150.66 /ea	904					413.44 /ea	
	30" Bolt & Gasket Kits, CS, 150#	6.00 ea	359.89 /ea	2,159	270.06 /ea	1,620					629.95 /ea	
	Install Control Valve, 24"	1.00 ea	1,199.62 /ea	1,200							1,199.62 /ea	
	FURNISH Control Valve. 24"	1.00 ea			21,320.22 /ea	21,320					21,320.22 /ea	
	FURNISH Magnetic Flow Meter, 24" (750mm)	1.00 ea			31,269.61 /ea	31,270					31,269.61 /ea	
		1.00 ea	799.74 /ea	800	31,209.01 /ea	31,270					799.74 /ea	
	Install magnetic flow meter, 24"				040.00 /							
	Double Strap Saddle, 30" x 1"	2.00 ea	257.08 /ea	514	319.80 /ea	640					576.88 /ea	
	Install Double Strap Saddle, 30" x 1"	2.00 ea	257.07 /ea	514	319.81 /ea	640					576.88 /ea	
	33.03.30.Intertie Intertie Above Grade Mechanical		/LS	16,032	/LS	134,701	/LS	2,432	/LS		/LS	
33.041.30	0.SIPS 30" SIPS Intertie SOG											
	Fine grade, for slab on grade, by hand	400.00 sf	0.28 /sf	113	0.01 /sf	6					0.30 /sf	
	Fill, gravel subbase, under building slab on grade	7.41 cy	20.20 /cy	150	35.54 /cy	263					55.74 /cy	
	Slab on grade edge forms, 7" to 12"	77.33 sf	6.64 /sf	514	1.92 /sf	148					8.56 /sf	
	Reinforcing in place, A615 Gr 60, priced per lbs.	1,481.48 lb			0.71 /lb	1,053	0.27 /lb	400			0.98 /lb	
	Concrete, ready mix, 4500 psi	9.88 CY			150.66 /CY	1,488	··				150.66 /CY	
	Add for concrete waste, 4500 psi	0.49 cy			150.67 /cy	74					150.67 /cy	
	Add amount for Short Loads - per concrete truck load	1.00 load			177.66 /load	178					177.66 /load	
	Add amount for Fuel Surcharges - per concrete truck load	2.00 load			21.33 /load	43					21.33 /load	
	Add amount for Environmental Fee - per concrete truck load	2.00 load			8.52 /load	17					8.52 /load	
	Placing concrete, direct chute	9.88 cy	18.18 /cy	180							18.18 /cy	
	Finishing floors, monolithic, broom finish	400.00 sf	0.70 /sf	280	0.03 /sf	11					0.73 /sf	
	Curing, membrane spray	400.00 sf	0.08 /sf	32	0.06 /sf	23					0.14 /sf	
	Concrete Pipe Support	4.00 ea	285.63 /ea	1,143	2,042.48 /ea	8,170					2,328.11 /ea	
	33.041.30.SIPS 30" SIPS Intertie SOG		/LS	2,411	/LS	11,474	/LS	400	/LS		/LS	
		40010								04 440		
	02 Greenland WTP SIPS Intertie Station	1.00 LS	37,375.67 /LS	37,376	393,476.41 /LS	393,476	65,400.16 /LS	65,400	21,147.57 /LS	21,148	517,399.81 /LS	
	Supervisory Control and Data Acquisition (SCADA) Design Integration											
27.00.SC	SCADA SCADA - Allowance - Match Deerwood WTP Tank Proposal											
	SCADA Allowance - Allowance - Match Deerwood WTP Tank Proposal	1.00 LS	/LS		/LS		62,567.32 /LS	62,567			62,567.32 /LS	
	27.00.SCADA SCADA - Allowance - Match Deerwood WTP Tank Proposal		/LS		/LS		/LS	62,567	/LS		/LS	

	Description	Takeoff Quantity	Labor Cost/Unit	Labor Amount Mate		Material Amount S		Sub Amount Equ	•	Equip Amount T		Tot
	03 Supervisory Control and Data Acquisition (SCADA) Design Integration	1.00 LS	/LS		/LS		62,567.32 /LS	62,567	/LS		62,567.32 /LS	
	Greenland WTP Ground Storage Tank											
26.00.000 Electrica	al Tank Site Electrical - Allowance - Match Deerwood WTP Tank Proposal											
	Tank Site Electrical - Allowance - Match Deerwood WTP Tank Proposal	1.00 LS			/LS		172,685.82 /LS	172,686			172,685.82 /LS	
	26.00.000 Electrical Tank Site Electrical - Allowance - Match Deerwood WTP Tank Proposal		/LS		/LS		/LS	172,686	/LS		/LS	
31.01.001.0	00 Earthwork GC's											
	Mobilization: Excavator, Medium	1.00 ea	834.55 /ea	835					1,128.47 /ea	1,128	1,963.02 /ea	
	Mobilization: Loader, Medium	2.00 ea	834.57 /ea	1,669					1,128.47 /ea	2,257	1,963.04 /ea	
	Mobilization: Dozer, Medium	2.00 ea	834.55 /ea	1,669					1,128.48 /ea	2,257	1,963.03 /ea	
	Mobilization: Compactor, Medium	2.00 ea	625.92 /ea	1,252					846.35 /ea	1,693	1,472.27 /ea	
	Mobilization: Water Truck	2.00 ea	625.92 /ea	1,252					846.37 /ea	1,693	1,472.28 /ea	
	Sitework Superintendent	3.00 mo	15,224.88 /mo	45,675							15,224.88 /mo	
	Drug Tests	5.00 ea					101.35 /ea	507			101.35 /ea	
	Safety Equipment - Project	1.00 ls			7,106.76 /ls	7,107					7,106.76 /ls	
	Safety Equipment - Per Worker	5.00 ea			213.20 /ea	1,066					213.20 /ea	
	First Aid Consumables	6.00 mo			355.34 /mo	2,132					355.34 /mo	
	Test pits, Vac Truck	10.00 ea	308.41 /ea	3,084	355.54 /1110	2,132			239.74 /ea	2,397	548.15 /ea	
	• •	10.00 ea			".0	40.00				·		
	31.01.001.00 Earthwork GC's		/LS	55,435	/LS	10,305	/LS	507	/LS	11,425	/LS	
31.03.042.0	00 Earthwork Site Preparation											
	Strip and Stockpile Top Soil	266.20 cy	4.84 /cy	1,289					6.82 /cy	1,815	11.66 /cy	
	Fence Demolition and Loading	432.00 lf	2.72 /lf	1,175					0.84 /lf	364	3.56 /lf	
	Rough Site Grading	695.11 sy	2.91 /sy	2,020					4.09 /sy	2,844	7.00 /sy	
	Silt Fence, Heavy-Duty, Subcontracted	500.00 If					4.05 /lf	2,027			4.05 /lf	
	Inlet Protection, Subcontracted	2.00 ea					101.36 /ea	203			101.36 /ea	
	Concrete Washout Pit	1.00 ea	301.01 /ea	301					565.31 /ea	565	866.32 /ea	
	Stabilized Construction Entrance, Clean Rock, 1-1/2" thru 3"	133.33 tn	10.51 /tn	1,401	28.43 /tn	3,790			14.11 /tn	1,881	53.04 /tn	
	Filter Fabric under Stabilized Construction Entrance	166.67 sy			2.13 /sy	355					2.13 /sy	
	Best Management Practice (BMP) Maintenance, Material	1.00 ls			710.67 /ls	711					710.67 /ls	
	31.03.042.00 Earthwork Site Preparation		/LS	6,186	/LS	4,856	/LS	2,230	/LS	7,469	/LS	
24 49 006 0	00 Earthwork Structural Ex: Structural Fill		720	0,100	720	4,000	720	2,200	720	7,403	720	
31.10.000.0	Structural Excavation	792.00 cy	4.84 /cy	3,835					6.82 /cy	5,400	11.66 /cy	
	Structural Backfill										•	
		792.00 cy	7.26 /cy	5,753		=-			10.23 /cy	8,100	17.49 /cy	
	Construction Water for Compaction	7,920.00 gal			0.01 /gal	79					0.01 /gal	
	Import Below Slab Aggregates / 2' Overexcavation Fill	1,092.96 tn	7.26 /tn	7,939	21.32 /tn	23,302			10.23 /tn	11,178	38.81 /tn	
	31.18.006.00 Earthwork Structural Ex: Structural Fill		/LS	17,528	/LS	23,381	/LS		/LS	24,679	/LS	
32.09.003.0	00 Ext. Improve: Restore-Landscape: Landscaping											
	Topsoil replacement including fine grade Topsoil replacement including fine grade, small crew	266.20 cy	6.57 /cy	1,750					7.35 /cy	1,956	13.92 /cy	
	Permanent Seed and Mulch	0.50 acre					2,027.00 /acre	1,014			2,027.00 /acre	
	32.09.003.00 Ext. Improve: Restore-Landscape: Landscaping		/LS	1,750	/LS		/LS	1,014	/LS	1,956	/LS	
32.10.001.0	00 Security Fence											
	Security Fence, Chain Link, 6'	432.00 If					31.93 /lf	13,794			31.93 /lf	
	32.10.001.00 Security Fence		/LS		/LS		/LS	13,794	/LS		/LS	
33.01.002.0	00 Utilities GC's							-, -				
00.0002.0	Mobilization: Excavator, Medium	1.00 ea	834.57 /ea	835					1,128.47 /ea	1,128	1,963.04 /ea	
	Mobilization: Loader, Medium	1.00 ea	834.55 /ea	835					1,128.46 /ea	1,128	1,963.01 /ea	
	Mobilization: Dozer, Small	1.00 ea	625.92 /ea	626					846.37 /ea	846	1,472.29 /ea	
	Mobilization: Compactor, Small											
	•	1.00 ea	625.91 /ea	626					846.36 /ea	846	1,472.27 /ea	
	Mobilization: Water Truck	1.00 ea	625.92 /ea	626					846.34 /ea	846	1,472.26 /ea	
	Conex Containers	6.00 mo							284.27 /mo	1,706	284.27 /mo	
	Add for hydrotesting pipeline (labor & Equipment per day)	1,131.00 lf	5.88 /lf	6,648					0.92 /lf	1,045	6.80 /lf	
	Add for disinfecting pipeline (labor & Equipment per day)	1,131.00 lf	5.88 /lf	6,648					0.92 /lf	1,045	6.80 /lf	
	Pipeline Superintendent	3.00 mo	15,224.88 /mo	45,675							15,224.88 /mo	
	Drug Tests	5.00 ea					101.35 /ea	507			101.35 /ea	
	Safety Equipment - Project	1.00 ls			9,070.31 /ls	9,070					9,070.31 /ls	
	Safety Equipment - Per Worker	5.00 ea			213.20 /ea	1,066					213.20 /ea	
	First Aid Consumables	6.00 mo			355.34 /mo	2,132					355.34 /mo	
	Dumpster Rental	6.00 mo			284.27 /mo	1,706					284.27 /mo	
	Dumpster Pulls	6.00 ea			426.40 /ea	2,558					426.40 /ea	
		1.00 ea	13,378.32 /ea	13,378	1,421.36 /ea	1,421					14,799.68 /ea	
		1.00 Ga	10,010.02 784		1,421.00 /6a	1,721			239.74 /ea	0.007		
	Final Clean-up	10.00 00	209 41 /00	3 U01								
	Test pits, Vac Truck	10.00 ea	308.41 /ea	3,084						2,397	548.15 /ea	
	Test pits, Vac Truck Unload Pipeline or Yardpipe	10.00 ea 1.00 days	863.43 /days	863					845.31 /days	845	1,708.74 /days	
	Test pits, Vac Truck				/LS	17,954	/LS	507				i

	cription	Takeoff Quantity	Labor Cost/Unit	Labor Amount Ma		Material Amount Sub (Cost/Unit	Sub Amount Equip Cost/Unit	Equip Amount T		Total An
	/C, Sch. 80, socket joint, pipe, excav/bkfill included	251.00 LF	32.60 /LF	8,181	1.48 /LF	371		37.70 /LF	9,462	71.77 /LF	
2" PV	/C, Sch. 80, socket joint, ELL, 45	4.00 ea	25.14 /ea	101	7.66 /ea	31				32.80 /ea	
Add fo	for tie-in to existing (Adjust productivity)	1.00 ea	1,629.74 /ea	1,630	1,066.02 /ea	1,066		1,884.81 /ea	1,885	4,580.57 /ea	
33.0	1.02.Forcemain Relocate Forcemain		/LF	12,410	/LF	1,468	/LF	/LF	13,390	/LF	
33.01.08.Drain 8" D	Orain Orain										
CMPC	CTION Water (Check Mainline Crew for Water TK, Tank & Operator) Update Wtr \$	510.00 gal			0.01 /gal	5				0.01 /gal	
8" pip	pe, DI, push-on joint, excav/bkfill included, 350#	51.00 LF	32.60 /LF	1,662	23.56 /LF	1,202		37.70 /LF	1,923	93.85 /LF	
8" DI,	l, MJ, cap or plug	1.00 ea	85.56 /ea	86	150.30 /ea	150		98.98 /ea	99	334.84 /ea	
8" DI,	l, MJ, reducer, 8" x 6"	1.00 ea	154.82 /ea	155	222.79 /ea	223		179.07 /ea	179	556.68 /ea	
Polyw	мгар, 8" pipe	51.00 lf			0.58 /lf	30				0.58 /lf	
Pipe I	Marking, ID Tape	51.00 lf	0.60 /lf	31	0.19 /lf	9				0.79 /lf	
Install	ll gate valve, MJ, 8"	1.00 ea	174.62 /ea	175				157.06 /ea	157	331.68 /ea	
Gate	valve, iron body, resil. seat, Flgd, 150#, NO, 8"	1.00 ea			710.66 /ea	711				710.66 /ea	
CI Va	alve Box & Cover, w/ Concrete Collar included	1.00 ea	174.64 /ea	175	213.18 /ea	213		157.09 /ea	157	544.91 /ea	
33.0	1.08.Drain 8" Drain		/LF	2,283	/LF	2,543	/LF	/LF	2,515	/LF	
33.01.16.Over Flow 16" (Over Flow										
	ding Stone, Material Only	35.35 tn			19.90 /tn	703				19.90 /tn	
	CTION Water (Check Mainline Crew for Water TK, Tank & Operator) Update Wtr \$	600.00 gal			0.01 /gal	6				0.01 /gal	
	Excess Spoils for Off-Site Hauling, Rubber Tire Loader, Cat 950	31.47 cy	0.26 /cy	8				0.44 /cy	14	0.70 /cy	
	ess Spoils Dump Charges for 17 yd end dumps, per cy	31.47 cy	,	-	14.64 /cy	461		,		14.64 /cy	
	pipe, DI, RJ, excav/bkfill included, 350#	60.00 LF	32.60 /LF	1,956	92.25 /LF	5,535		37.70 /LF	2,262	162.54 /LF	
·	DI, RJ, EII, 90	1.00 ea	228.15 /ea	228	1,463.99 /ea	1,464		263.88 /ea	264	1,956.02 /ea	
	alugs for DI Pipe w/ Accessories, 16"	4.00 ea	87.31 /ea	349	419.77 /ea	1,679		78.54 /ea	314	585.61 /ea	
-	wrap, 16" pipe	60.00 lf	07.01 7cu	040	0.95 /lf	57		70.04 700	014	0.95 /lf	
	Marking, ID Tape	60.00 lf	0.60 /lf	36	0.19 /lf	11				0.78 /lf	
•	1.16.Over Flow 16" Over Flow	00.00 11	/LF	2,577	/LF	9,916	/LF	/LF	2,854	/LF	
			/LF	2,577	/LF	3,310	/LF	/LF	2,034	/LF	
33.01.18.Drain 18" [CTION Water (Check Mainline Crew for Water TK, Tank & Operator) Update Wtr \$	2 190 00 .cal			0.01 /aal	22				0.01 /acl	
		2,180.00 gal	20.27 // 5	4 444	0.01 /gal			22.50 // 5	E 420	0.01 /gal	
·	sipe, RCP, Class III B & S, excav/bkfill included, 0-8'	218.00 LF	20.37 /LF	4,441	32.68 /LF	7,124		23.56 /LF	5,136	76.61 /LF	
	pend, RCP, B & S	1.00 ea	203.72 /ea	204	490.15 /ea	490		235.61 /ea	236	929.48 /ea	
	for tie-in to existing (Adjust productivity)	1.00 ea	1,629.73 /ea	1,630	1,066.01 /ea	1,066		1,884.81 /ea	1,885	4,580.55 /ea	
	1.18.Drain 18" Drain		/LF	6,275	/LF	8,701	/LF	/LF	7,257	/LF	
33.01.24.RW Fill 24" F						_					
	CTION Water (Check Mainline Crew for Water TK, Tank & Operator) Update Wtr \$	600.00 gal			0.01 /gal	6				0.01 /gal	
	Excess Spoils for Off-Site Hauling, Rubber Tire Loader, Cat 950	41.96 cy	0.26 /cy	11				0.44 /cy	19	0.70 /cy	
	ess Spoils Dump Charges for 17 yd end dumps, per cy	41.96 cy			14.64 /cy	614				14.64 /cy	
·	pipe, DI, RJ, excav/bkfill included, 350#	60.00 LF	32.60 /LF	1,956	171.51 /LF	10,291		37.70 /LF	2,262	241.81 /LF	
	DI, RJ, EII, 90	1.00 ea	289.28 /ea	289	3,596.00 /ea	3,596		334.57 /ea	335	4,219.85 /ea	
24" D	DI, RJ, EII, 22 1/2	1.00 ea	289.29 /ea	289	2,856.90 /ea	2,857		334.54 /ea	335	3,480.73 /ea	
Polyw	wrap, 24" pipe	60.00 If			1.58 /lf	95				1.58 /lf	
Add f	for tie-in to existing (Adjust productivity)	1.00 ea	1,629.77 /ea	1,630	1,066.00 /ea	1,066		1,884.82 /ea	1,885	4,580.59 /ea	
Pipe I	Marking, ID Tape	60.00 If	0.60 /lf	36	0.19 /lf	11				0.79 /lf	
33.0	1.24.RW Fill 24" RW Fill		/LF	4,211	/LF	18,536	/LF	/LF	4,834	/LF	
33.01.30.SIPS II 30" S	SIPS - Intertie to New Tank										
CMPC	CTION Water (Check Mainline Crew for Water TK, Tank & Operator) Update Wtr \$	2,750.00 gal			0.01 /gal	27				0.01 /gal	
30" pi	pipe, DI, RJ, excav/bkfill included, 250#	275.00 LF	32.60 /LF	8,964	212.16 /LF	58,345		37.70 /LF	10,366	282.46 /LF	
30" D	DI, RJ, EII, 90	1.00 ea	350.38 /ea	350	5,457.99 /ea	5,458		405.23 /ea	405	6,213.60 /ea	
30" D	DI, RJ, EII, 45	3.00 ea	350.40 /ea	1,051	4,576.73 /ea	13,730		405.24 /ea	1,216	5,332.37 /ea	
30" D	DI, RJ, wye	1.00 ea	525.61 /ea	526	10,631.66 /ea	10,632		607.86 /ea	608	11,765.13 /ea	
Mega	alugs for DI Pipe w/ Accessories, 30"	2.00 ea	116.41 /ea	233	2,110.96 /ea	4,222		104.71 /ea	209	2,332.08 /ea	
	alugs for DI Pipe w/ Accessories, 30"	2.00 ea	116.42 /ea	233	2,110.95 /ea	4,222		104.71 /ea	209	2,332.08 /ea	
	wrap, 30" pipe	275.00 lf			1.88 /lf	516				1.88 /lf	
	Marking, ID Tape	275.00 lf	0.60 /lf	165	0.19 /lf	51				0.78 /lf	
	Il gate vaive, MJ, 30"	2.00 ea	535.49 /ea	1,071				481.67 /ea	963	1,017.16 /ea	
	valve, iron body, solid wedge, MJ, 150#, NO, 30"	2.00 ea		-,	58,630.54 /ea	117,261				58,630.54 /ea	
	alve Box & Cover, w/ Concrete Collar included	2.00 ea	174.61 /ea	349	213.20 /ea	426		157.07 /ea	314	544.88 /ea	
	11.30.SIPS II 30" SIPS - Intertie to New Tank	2.50 64	/LF	12,941	/LF	214,890	/LF	/LF	14,292	/LF	
33.01.30.TkDis 30" 1			/LF	14,341	/LF	Z 1~,030	/LF	/LF	14,232	/LF	
	-	28.58 tn			19.90 /tn	EGO				19.90 /tn	
	ding Stone, Material Only					569					
	CTION Water (Check Mainline Crew for Water TK, Tank & Operator) Update Wtr \$	400.00 gal	2.22 /	_	0.01 /gal	4		2	<i>4</i> =	0.01 /gal	
	Excess Spoils for Off-Site Hauling, Rubber Tire Loader, Cat 950	27.97 cy	0.26 /cy	7				0.44 /cy	12	0.70 /cy	
	ess Spoils Dump Charges for 17 yd end dumps, per cy	27.97 cy			14.64 /cy	409				14.64 /cy	
	pipe, DI, RJ, excav/bkfill included, 350#	40.00 LF	32.60 /LF 32.60 /LF	1,304 8,638	171.51 /LF 212.16 /LF	6,861 56,224		37.70 /LF	1,508	241.81 /LF	

Bid Item	WorkActiv	Description	Takeoff Quantity	Labor Cost/Unit	Labor Amount Ma	aterial Cost/Unit	Material Amount	Sub Cost/Unit	Sub Amount E	auip Cost/Unit	Equip Amount	Total Cost/Unit	Total Amount
		30" DI, RJ, EII, 90	1.00 ea	350.39 /ea	350	5,457.96 /ea	5,458			405.26 /ea	405	6,213.61 /ea	6,214
		30" DI, RJ, EII, 45	4.00 ea	350.39 /ea	1,402	4,576.74 /ea	18,307			405.24 /ea	1,621	5,332.36 /ea	21,329
		30" DI, RJ, red. tee, 30" x 24"	1.00 ea	492.99 /ea	493	5,230.57 /ea	5,231			570.17 /ea	570	6,293.73 /ea	6,294
		30" DI, RJ, reducer, 30" x 24"	1.00 ea	321.86 /ea	322	3,439.66 /ea	3,440			372.24 /ea	372	4,133.76 /ea	4,134
		Megalugs for DI Pipe w/ Accessories, 30"	2.00 ea	116.42 /ea	233	2,110.96 /ea	4,222			104.71 /ea	209	2,332.08 /ea	4,664
		Megalugs for DI Pipe w/ Accessories, 30"	12.00 ea	116.41 /ea	1,397	2,110.95 /ea	25,331			104.71 /ea	1,257	2,332.08 /ea	27,985
		Polywrap, 24" pipe	40.00 lf	110.41 700	1,001	1.58 /lf	63			104.71 76u	1,201	1.58 /lf	63
		Polywrap, 30" pipe	265.00 lf			1.88 /lf	497					1.88 /lf	497
		Add for tie-in to existing (Adjust productivity)	1.00 ea	1,629.74 /ea	1,630	1,066.00 /ea	1,066			1,884.81 /ea	1,885	4,580.55 /ea	4,581
		- · · · · · · · · · · · · · · · · · · ·		1,029.74 /ea	1,030	1,000.00 /ea	1,000	13,513.47 /ea	27,027	1,004.01 /ea	1,000	13,513.47 /ea	
		Add for tie-in to existing, wet tap by subcontractor ("24 on 30")	2.00 ea	0.00 //4	24	0.40.46	7	13,313.47 /ea	21,021				27,027
		Pipe Marking, ID Tape	40.00 If	0.60 /lf	24	0.19 /lf	•					0.78 /lf	31
		Pipe Marking, ID Tape	265.00 If	0.60 /lf	159	0.19 /lf	49					0.78 /lf	208
		Install gate valve, MJ, 30"	1.00 ea	535.49 /ea	535					481.68 /ea	482	1,017.17 /ea	1,017
		Gate valve, iron body, solid wedge, MJ, 150#, NO, 30"	1.00 ea			58,630.53 /ea	58,631					58,630.53 /ea	58,631
		CI Valve Box & Cover, w/ Concrete Collar included	1.00 ea	174.62 /ea	175	213.20 /ea	213			157.07 /ea	157	544.89 /ea	545
		33.01.30.TkDis 30" Tank Discharge		/LF	16,668	/LF	186,581	/LF	27,027	/LF	18,468	/LF	248,744
	33.16.013.14	4B 1.1MG Storage Tank											
		Prestressed Concrete Ground Storage Tank	1,100,000.00 gal					0.60 /gal	656,957			0.60 /gal	656,957
		30" Water Fill Pipe	1.00 ls					62,567.32 /ls	62,567			62,567.32 /ls	62,567
		24" RW fill	1.00 ls					43,797.14 /ls	43,797			43,797.14 /ls	43,797
		30" Discharge	1.00 ls					18,770.20 /ls	18,770			18,770.20 /ls	18,770
		Vortex Breaker	1.00 ls					2,502.70 /ls	2,503			2,502.70 /ls	2,503
		24" Tank discharge	Is					/Is				/Is	
		Tank Overflow	1.00 ls					31,283.65 /ls	31,284			31,283.65 /ls	31,284
		Tank Drain	1.00 ls					31,283.66 /ls	31,284			31,283.66 /ls	31,284
		Tray Aerators	1.00 ls					81,337.52 /ls	81,338			81,337.52 /ls	81,338
		Ventilation	1.00 ls					37,540.40 /ls	37,540			37,540.40 /ls	37,540
		Level Controls	1.00 ls					3,128.36 /ls	3,128			3,128.36 /ls	3,128
		Emergency Overflows	1.00 ls					10,010.77 /ls	10,011			10,010.77 /ls	10,011
		Handrail	1.00 ls					10,010.78 /ls	10,011			10,010.78 /ls	10,011
		Stairs	1.00 ls					88,219.92 /ls	88,220			88,219.92 /ls	88,220
		Ladder	1.00 ls					6,256.74 /ls	6,257			6,256.74 /ls	6,257
		Baffles	1.00 ls										
								175,336.17 /ls	175,336			175,336.17 /ls	175,336
		Coatings	1.00 ls					166,641.80 /ls	166,642			166,641.80 /ls	166,642
		33.16.013.14B 1.1MG Storage Tank	1.00 LS	/LS		/LS		1,425,644.03 /LS	1,425,644	/LS		1,425,644.03 /LS	1,425,644
06		05 Greenland WTP Ground Storage Tank Replacement of High Service Pumps	1.00 LS	218,106.19 /LS	218,106	499,130.76 /LS	499,131	1,643,407.10 /LS	1,643,407	120,973.11 /LS	120,973	2,481,617.16 /LS	2,481,617
	26-xxx-0	10 Gear											
		200HP VFD	2.00 E	572.25 /E	1,144	38,033.67 /E	76,067					38,605.92 /E	77,212
		1600A trip Plug replacement	1.00 E	1,144.47 /E	1,144	9,128.08 /E	9,128					10,272.55 /E	10,273
		Sawcut and Patch Concrete by cu feet	200.00 E					21.77 /E	4,354			21.77 /E	4,354
		Enclosed Circuit Breaker NEMA 1 400A 3P 600V	2.00 E	534.10 /E	1,068	6,085.39 /E	12,171					6,619.48 /E	13,239
		Circuit Breaker Mounting Hardware 400A	2.00 E	143.05 /E	286	22.83 /E	46					165.88 /E	332
		Hvy Duty NonFused Safety Switch NEMA 4X 400A 3P 600V	2.00 E	534.10 /E	1,068	11,249.60 /E	22,499					11,783.70 /E	23,567
		Safety Switch Mounting Hardware - 400A	2.00 E	143.07 /E	286	98.89 /E	198					241.95 /E	484
		26-xxx-010 Gear			4,998		120,109		4,354				129,460
	26-xxx-02	25 Motors											
		Electrical Trench Excavation - Unclassified	59.26 cy	31.47 /cy	1,865							31.47 /cy	1,865
		Electrical Trench Excavation - Layback - Unclassified	59.26 cy	42.92 /cy	2,543							42.92 /cy	2,543
		Electrical Trench Bedding - Crushed Gravel	7.41 cy	51.42 /cy	381	45.65 /cy	338			8.39 /cy	62	105.45 /cy	781
		Electrical Trench Backfill - Reuse Trench Spoils	96.30 cy	25.75 /cy	2,480	,				15.11 /cy	1,455	40.86 /cy	3,935
		Electrical Trench Spoils - Waste on Site	22.22 cy	14.31 /cy	318					10.08 /cy	224	24.38 /cy	542
		2500 psi Duct Bank Concrete	14.82 cy	61.99 /cy	918	174.96 /cy	2,592			,		236.95 /cy	3,510
		Add Color Die for Duct Bank Concrete	14.82 cy			27.39 /cy	406					27.39 /cy	406
		Duct Bank Reinforcing Re-bar #4	800.00 If	0.95 /lf	763	0.76 /lf	610					1.72 /lf	1,373
		Duct Bank Reinforcing Re-bar #4 (Ties)	800.00 lf	2.38 /lf	1,907	0.79 /lf	634					3.18 /lf	2,542
		Hex Nut 3/8"	8.00 E	2.30 /11	1,507	0.79 /II 0.46 /E	4					0.46 /E	2,342
							4						•
		Hex Screw 3/8" x 1"	8.00 E	4.45 ***	^	0.14 /E	•					0.14 /E	1
		THHN-THWN Copper Stranded 1/C # 6	8.00 If	1.15 /lf	9	0.63 /lf	5					1.78 /lf	14
		THHN-THWN Copper Stranded 1/C # 350	24.00 If	3.82 /lf	92	7.54 /lf	181					11.36 /lf	273
		XHHW Copper Stranded 1/C # 3	140.00 If	1.72 /lf	240	1.23 /lf	172					2.94 /lf	412
		XHHW Copper Stranded 1/C # 3	140.00 If	1.72 /lf	240	1.23 /lf	172					2.94 /lf	412
		XHHW Copper Stranded 1/C # 3	140.00 If	1.72 /lf	240	1.23 /lf	172					2.94 /lf	412
		XHHW Copper Stranded 1/C # 3	140.00 If	1.72 /lf	240	1.23 /lf	172					2.94 /lf	412

Bid Item WorkActiv	Description	Takeoff Quantity	Labor Cost/Unit	Labor Amount Mate	erial Cost/Unit	Material Amount Sub Cost/Unit	Sub Amount Equip Cost/Unit	Equip Amount Total Cost/Unit	Total Amount
	XHHW Copper Stranded 1/C # 3	250.00 lf	1.72 /lf	429	1.23 /lf	307		2.94 /lf	736
	XHHW Copper Stranded 1/C # 3/0	420.00 If	2.58 /lf	1,082	4.31 /lf	1,812		6.89 /lf	2,894
	XHHW Copper Stranded 1/C # 3/0	420.00 If	2.58 /lf	1,082	4.31 /lf	1,812		6.89 /lf	2,894
	XHHW Copper Stranded 1/C # 3/0	420.00 If	2.58 /lf	1,082	4.31 /lf	1,812		6.89 /lf	2,894
	XHHW Copper Stranded 1/C # 3/0	420.00 If	2.58 /lf	1,082	4.31 /lf	1,812		6.89 /lf	2,894
	XHHW Copper Stranded 1/C # 3/0	3,000.00 If	2.58 /lf	7,725	4.31 /lf	12,943		6.89 /lf	20,668
	GRC Conduit @ Level 2 2"	100.00 If	14.31 /lf	1,431	6.61 /lf	660		20.91 /lf	2,091
	GRC Conduit @ Level 2 2"	90.00 If	14.31 /lf	1,288	6.60 /lf	594		20.91 /lf	1,882
	GRC Conduit @ Level 2 2"	100.00 If	14.31 /lf	1,431	6.61 /lf	660		20.91 /lf	2,091
	GRC Conduit @ Level 2 2"	90.00 If	14.31 /lf	1,288	6.61 /lf	594		20.91 /lf	1,882
	GRC Elbow 2"	8.00 E	41.96 /E	336	49.49 /E	396		91.45 /E	732
	GRC Elbow 2"	8.00 E	41.97 /E	336	49.49 /E	396		91.45 /E	732
	GRC Elbow 2"	8.00 E	41.96 /E	336	49.49 /E	396		91.45 /E	732
	GRC Elbow 2"	8.00 E	41.96 /E	336	49.49 /E	396		91.45 /E	732
	GRC Coupling 2"	16.00 E	8.58 /E	137	11.68 /E	187		20.27 /E	324
	GRC Coupling 2"	16.00 E	8.58 /E	137	11.68 /E	187		20.27 /E	324
	GRC Coupling 2"	16.00 E	8.58 /E	137	11.69 /E	187		20.27 /E	324
	GRC Coupling 2"	16.00 E	8.58 /E	137	11.69 /E	187		20.27 /E	324
	Locknut 2"	8.00 E	4.77 /E	38	3.97 /E	32		8.74 /E	70
			4.77 /E					8.74 /E	
	Locknut 2"	8.00 E		38	3.97 /E	32			70
	Locknut 2"	8.00 E	4.77 /E	38	3.97 /E	32		8.74 /E	70
	Locknut 2"	8.00 E	4.77 /E	38	3.97 /E	32		8.74 /E	70
	Ins Grounding Bushing 2"	4.00 E	49.60 /E	198	34.90 /E	140		84.50 /E	338
	Ins Grounding Bushing 2"	4.00 E	49.60 /E	198	34.90 /E	140		84.49 /E	338
	Ins Grounding Bushing 2"	4.00 E	49.60 /E	198	34.90 /E	140		84.49 /E	338
	Ins Grounding Bushing 2"	4.00 E	49.60 /E	198	34.90 /E	140		84.50 /E	338
	Ins Grounding Bushing 2"	16.00 E	49.59 /E	794	34.90 /E	558		84.49 /E	1,352
	Malleable LBD Condulet - 2"	2.00 E	71.53 /E	143	165.86 /E	332		237.39 /E	475
	Malleable LBD Condulet - 2"	2.00 E	71.53 /E	143	165.87 /E	332		237.39 /E	475
	Unistrut Straps 2"	14.00 E	3.81 /E	53	4.66 /E	65		8.47 /E	119
	Unistrut Straps 2"	12.00 E	3.81 /E	46	4.66 /E	56		8.47 /E	102
	Unistrut Straps 2"	14.00 E	3.82 /E	53	4.66 /E	65		8.47 /E	119
	Unistrut Straps 2"	12.00 E	3.82 /E	46	4.66 /E	56		8.47 /E	102
	Unistrut Conduit Hanger Allowance 2"	14.00 E	5.72 /E	80	2.28 /E	32		8.00 /E	112
	Unistrut Conduit Hanger Allowance 2"	12.00 E	5.72 /E	69	2.28 /E	27		8.00 /E	96
	Unistrut Conduit Hanger Allowance 2"	14.00 E	5.72 /E	80	2.28 /E	32		8.00 /E	112
	Unistrut Conduit Hanger Allowance 2"	12.00 E	5.72 /E	69	2.28 /E	27		8.01 /E	96
	UA Sealtite Flex 3"	6.00 If	8.58 /lf	51	26.63 /lf	160		35.21 /lf	211
	LT Flex Connector w/ Insul Throat Straight 3"	2.00 E	20.98 /E	42	349.25 /E	698		370.23 /E	740
	LT Flex Connector w/ Insul Throat 90 Deg 3"	2.00 E	23.85 /E	48	496.15 /E	992		520.00 /E	1,040
	PVC Sch 40 in Trench 2"	800.00 If	4.20 /lf	3,357	1.32 /lf	1,052		5.51 /lf	4,409
	PVC Coated GRC in Trench 2"	100.00 If	11.45 /lf	1,144	21.79 /lf	2,179		33.23 /lf	3,323
	PVC Coated GRC Elbow 90 deg 2"	16.00 E	61.99 /E	992	67.11 /E	1,074		129.11 /E	2,066
	PVC Coated Coupling 2"	16.00 E	11.44 /E	183	20.06 /E	321		31.50 /E	504
	PVC Base Spacers < 2"	160.00 E	4.77 /E	763	1.52 /E	243		6.29 /E	1,006
	Duct Bank Warning Tape	200.00 If	2.38 /lf	477	0.38 /lf	76		2.77 /lf	553
	PVC Solvent Cement - Qt	3.20 E	0.95 /E	3	9.13 /E	29		10.08 /E	32
	Compression Lug - 350 MCM	16.00 E	57.22 /E	916	21.63 /E	346		78.86 /E	1,262
	Termination Labor Only - # 3	4.00 E	19.08 /E	76				19.08 /E	76
	Termination Labor Only - # 3	4.00 E	19.08 /E	76				19.08 /E	76
	Termination Labor Only - # 3	4.00 E	19.07 /E	76				19.07 /E	76
	Termination Labor Only - # 3	4.00 E	19.08 /E	76				19.08 /E	76
	Termination Labor Only - # 3	2.00 E	19.08 /E	38				19.08 /E	38
	Termination Labor Only - 3/0	12.00 E	47.69 /E	572				47.69 /E	572
		12.00 E	47.69 /E	572				47.69 /E	572
	Termination Labor Only - 3/0			572				47.69 /E 47.69 /E	
	Termination Labor Only - 3/0	12.00 E	47.69 /E						572
	Termination Labor Only - 3/0	12.00 E	47.69 /E	572				47.69 /E	572
	Termination Labor Only - 3/0	24.00 E	47.69 /E	1,144	44.00	204		47.69 /E	1,144
	480V Motor Conn Insulating Boot - # 350	8.00 E	333.81 /E	2,670	41.42 /E	331		375.23 /E	3,002
	Motor Testing & Commissioning: 200 HP / 480v / 350	2.00 E	562.71 /E	1,125				562.71 /E	1,125
	600V Megger Testing	2.00 E	23.85 /E	48				23.85 /E	48
	600V Megger Testing	2.00 E	23.84 /E	48				23.84 /E	48
	600V Megger Testing	6.00 E	23.85 /E	143				23.85 /E	143
	600V Megger Testing	2.00 E	23.85 /E	48				23.85 /E	48

WorkActiv	Description	Takeoff Quantity	Labor Cost/Unit	Labor Amount Mate	erial Cost/Unit	Material Amount Sub Cos	st/Unit	Sub Amount Equip Cost/Unit	Equip Amount Total Cost/Unit	Total Amoun
	600V Megger Testing	6.00 E	23.84 /E	143					23.84 /E	1.
	600V Megger Testing	6.00 E	23.85 /E	143					23.85 /E	1.
	600V Megger Testing	2.00 E	23.84 /E	48					23.84 /E	•
	600V Megger Testing	6.00 E	23.84 /E	143					23.84 /E	14
	600V Megger Testing	2.00 E	23.85 /E	48					23.85 /E	•
	600V Megger Testing	12.00 E	23.84 /E	286					23.84 /E	28
	600V Megger Testing	1.00 E	23.85 /E	24					23.85 /E	:
	Wire Markers	4.00 E	0.96 /E	4	0.23 /E	1			1.19 /E	
	Wire Markers	12.00 E	0.95 /E	11	0.23 /E	3			1.18 /E	
	Wire Markers	4.00 E	0.96 /E	4	0.24 /E	1			1.19 /E	
	Wire Markers	12.00 E	0.95 /E	11	0.23 /E	3			1.18 /E	
	Wire Markers	4.00 E	0.96 /E	4	0.23 /E	1			1.18 /E	
	Wire Markers	12.00 E	0.96 /E	11	0.23 /E	3			1.18 /E	
	Wire Markers	12.00 E	0.96 /E	11	0.23 /E	3			1.18 /E	
						3				
	Wire Markers	4.00 E	0.96 /E	4	0.23 /E	1			1.18 /E	
	Wire Markers	24.00 E	0.95 /E	23	0.23 /E	5			1.18 /E	
	Wire Markers	2.00 E	0.95 /E	2	0.23 /E	0			1.18 /E	
	26-xxx-025 Motors			51,324		40,587			1,741	93,
26-xxx-0	030 Controls									
	Shielded PLTC / Inst Cable 4 Pair #14	360.00 lf	2.62 /lf	944	3.88 /lf	1,397			6.50 /lf	2
	GRC Conduit @ Level 2 1"	100.00 If	9.54 /lf	954	3.27 /lf	327			12.81 /lf	1
	Locknut 1"	4.00 E	3.81 /E	15	1.33 /E	5			5.14 /E	
	Ins Grounding Bushing 1"	2.00 E	33.39 /E	67	18.40 /E	37			51.79 /E	
	Unistrut Straps 1"	13.00 E	2.86 /E	37	3.20 /E	42			6.06 /E	
	Unistrut Conduit Hanger Allowance 1"	13.00 E	3.81 /E	50	1.90 /E	25			5.72 /E	
	Wire Markers	48.00 E	0.95 /E	46	0.23 /E	11			1.18 /E	
	Cable Markers	6.00 E	1.91 /E	11	0.38 /E	2			2.29 /E	
	26-xxx-030 Controls			2,124		1,845				3
40.PS.00	010 Piping									
	Paint pipe supports, subcontracted	2.00 ea					105.11 /ea	210	105.11 /ea	
	Paint pipe supports, subcontracted	2.00 ea					105.11 /ea	210	105.11 /ea	
	Paint process pipe and fittings, subcontracted, priced per LF, 10" dia.	14.00 lf					18.92 /lf	265	18.92 /lf	
	Paint process pipe and fittings, subcontracted, priced per LF, 14" dia.	14.00 lf					25.22 /lf	353	25.22 /lf	
	Paint process pipe and fittings, subcontracted, priced per LF, 20" dia.	43.00 lf					37.84 /lf	1,627	37.84 /lf	
	Paint process pipe and fittings, subcontracted, priced per LF, 24" dia.	30.00 lf					44.14 /lf	1,324	44.14 /lf	
	Add for hydrotesting	2.00 line	236.97 /line	474			44.14 /11	1,024	236.97 /line	
			230.97 /11116	474	27.00 //4	74				5
	FURNISH 10" DI pipe	2.00 lf			37.08 /lf	74			37.08 /lf	
	Install 10" DI, flanged, spool <= 10'	2.00 ea	285.53 /ea	571					285.53 /ea	
	FURNISH 10" DI flange	4.00 ea			213.46 /ea	854			213.46 /ea	
	FURNISH 14" DI pipe	2.00 lf			63.96 /lf	128			63.96 /lf	
	Install 14" DI, flanged, spool <= 10'	2.00 ea	458.52 /ea	917					458.52 /ea	
	FURNISH 14" DI flange	4.00 ea			301.91 /ea	1,208			301.91 /ea	
	FURNISH 20" DI pipe	13.00 lf			83.34 /lf	1,083			83.34 /lf	
	Install 20" DI, flanged, spool <= 10'	4.00 ea	594.17 /ea	2,377					594.17 /ea	
	FURNISH 20" DI flange	8.00 ea		•	484.75 /ea	3,878			484.75 /ea	
	20" DI, FL, reducer, 20" x 10"	2.00 ea	594.17 /ea	1,188	1,482.38 /ea	2,965			2,076.55 /ea	
		2.00 ea	553.89 /ea	1,108	647.40 /ea	1,295			1,201.29 /ea	
	20" DI, flanged coupling adapter		553.89 /ea	1,106						
	FURNISH 24" DI pipe	12.00 lf			104.17 /lf	1,250			104.17 /lf	
	Install 24" DI, flanged, spool <= 10'	2.00 ea	709.68 /ea	1,419					709.68 /ea	
	FURNISH 24" DI flange	4.00 ea			756.89 /ea	3,028			756.89 /ea	;
	24" DI, FL, reducer, 24" x 14"	2.00 ea	709.69 /ea	1,419	2,343.12 /ea	4,686			3,052.80 /ea	
	24" DI, flanged coupling adapter	2.00 ea	666.45 /ea	1,333	776.87 /ea	1,554			1,443.31 /ea	
	Pipe stand support, CS, 20"	2.00 ea	236.96 /ea	474	1,121.17 /ea	2,242			1,358.12 /ea	
	Pipe stand support, CS, 24"	2.00 ea	236.95 /ea	474	1,672.92 /ea	3,346			1,909.87 /ea	
	10" Bolt & Gasket Kits, CS, 150#	4.00 ea	130.33 /ea	521	26.49 /ea	106			156.81 /ea	
	14" Bolt & Gasket Kits, CS, 150#	4.00 ea	148.10 /ea	592	55.91 /ea	224			204.01 /ea	
	20" Bolt & Gasket Kits, CS, 150#	10.00 ea	242.88 /ea	2,429	117.71 /ea	1,177			360.59 /ea	
	24" Bolt & Gasket Kits, CS, 150#	4.00 ea	272.50 /ea	1,090	155.96 /ea	624			428.47 /ea	
	Pipe Information Labels	2.00 ea	9.89 /ea	20	14.71 /ea	29			24.60 /ea	
	Pipe Information Labels	2.00 ea	9.90 /ea	20	14.71 /ea	29			24.61 /ea	
	Install butterfly valve, Flgd, DIP, 20"	2.00 ea	622.01 /ea	1,244					622.01 /ea	
	Install butterfly valve, Flgd, DIP, 24"	2.00 ea	734.57 /ea	1,469					734.57 /ea	
	FURNISH Butterfly valve, iron body, Flgd, HWO, 150#, 20"	2.00 ea			3,925.56 /ea	7,851			3,925.56 /ea	7

Bid Item WorkActiv	Description	Takeoff Quantity	Labor Cost/Unit	Labor Amount	Material Cost/Unit	Material Amount Su	b Cost/Unit	Sub Amount Equip Cost/Unit	Equip Amount Total Cost/Unit	Total Amount
	Install check valve, Flgd, DIP, 20"	2.00 ea	622.00 /ea	1,244			<u> </u>		622.00 /ea	1,244
	FURNISH Check valve, iron body, rubber flapper, flgd, 150#, 20"	2.00 ea			14,713.48 /ea	29,427			14,713.48 /ea	29,427
	40.PS.0010 Piping			20,383		78,834		3,990		103,207
44.42.5	56.02 Horizontal Split Case Pump									
	Demo Existing housekeeping pad	2.00 ea	167.58 /ea	335	220.70 /ea	441			388.28 /ea	777
	Edge forms, housekeeping pads >6" Deep	28.00 sf	7.12 /sf	199	1.99 /sf	56			9.11 /sf	255
	Speed Dowels, #4	16.00 ea	11.48 /ea	184	13.24 /ea	212			24.72 /ea	396
	Reinforcing in place, A615 Gr 60, priced per lbs.	133.33 lb			1.47 /lb	196	0.56 /lb	75	2.03 /lb	271
	Concrete, ready mix, 4500 psi	0.89 CY			213.37 /CY	189			213.37 /CY	189
	Add for concrete waste, 4500 psi	0.04 cy			213.18 /cy	9			213.18 /cy	9
	Add amount for Short Loads - per concrete truck load	4.00 cy			213.34 /cy	853			213.34 /cy	853
	Placing concrete, direct chute wheel barrow	0.89 cy	94.37 /cy	84					94.37 /cy	84
	Finish housekeeping pads	24.00 sf	2.02 /sf	48					2.02 /sf	48
	Sack rub	28.00 sf	1.68 /sf	47	0.07 /sf	2			1.75 /sf	49
	Curing, membrane spray	24.00 sf	0.35 /sf	8	0.61 /sf	15			0.96 /sf	23
	Functional Testing, Pumps, 200 hp	2.00 ea	172.57 /ea	345	147.14 /ea	294			319.70 /ea	639
	Align Pump & Motor, 200 hp	2.00 ea	258.85 /ea	518			1,471.41 /ea	2,943	1,730.26 /ea	3,461
	Vibration Testing, Pumps, 200 hp	2.00 ea	86.29 /ea	173			490.47 /ea	981	576.75 /ea	1,154
	Pressure indicators	4.00 ea	64.71 /ea	259	367.84 /ea	1,471			432.55 /ea	1,730
	Sleeved anchor bolts - Medium	16.00 ea	15.10 /ea	242	30.90 /ea	494			46.00 /ea	736
	Non-Shrink Machine Grout	16.00 cuft	40.98 /cuft	656	108.88 /cuft	1,742			149.86 /cuft	2,398
	Grease, Oil, and Lube Pumps, 200 hp	2.00 ea	172.56 /ea	345	110.35 /ea	221			282.91 /ea	566
	FURNISH Horizontal Split-Case Pump, 200 hp	2.00 EA			68,567.33 /EA	137,135			68,567.33 /EA	137,135
	Demo pump assembly, pipe and accessories, 75 hp	2.00 ea	1,035.37 /ea	2,071	73.56 /ea	147			1,108.93 /ea	2,218
	Set pump assembly, 200 hp	2.00 ea	2,588.44 /ea	5,177	73.57 /ea	147			2,662.00 /ea	5,324
	44.42.56.02 Horizontal Split Case Pump			10,690		143,626		3,998		158,314
	06 Replacement of High Service Pumps			89,519		385,001		12,342	1,741	488,603