

INVITATION TO BID

ITB No. C-1965



BIMT EQUIPMENT WASH FACILITY (100% SEB Set-Aside)

ITB DUE DATE: WEDNESDAY, DECEMBER 11, 2024 AT 2:00 PM (ET)

Jerrie Gunder, Senior Contract Specialist

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PROCUREMENT SERVICES

2831 Talleyrand Avenue, Jacksonville, Florida 32206

JAXPORT.com/procurement/active-solicitations



BID RELATED DOCUMENTS

FOR

BIMT EQUIPMENT WASH FACILITY

Contract No.: C-1965

BLOUNT ISLAND MARINE TERMINAL

BID RELATED DOCUMENTS

INDEX

ITEM	PAGE NO(S).
INVITATION TO BID	ITB
BID CONTENTS AND FORMAT	BCF-1 TO BCF-2
“NO BID” RESPONSE	NB
SUPPLEMENTAL INSTRUCTIONS TO BIDDERS	SIB-1 TO SIB-21
ATTACHMENT NO. 1 – HOW TO SUBMIT YOUR BID RESPONSE IN TRIMBLE UNITY CONSTRUCT (E-BUILDER).....	EBSG-1 TO EBSG-3
ARTICLE V – JAXPORT PROCUREMENT GOALS SMALL AND EMERGING BUSINESS (SBE) PARTICIPATION POLICY, GOALS, CONDITIONS AND INSTRUCTIONS	SEB-1 TO SEB-3

BID RELATED FORMS

- SEB FORM 1 SEB FORM-1
- BIDDERS MINIMUM REQUIREMENTS MR-1 TO MR-4
- CONFLICT OF INTEREST CERTIFICATE..... COI-1 TO COI-3
- BID FORM..... BF-1 TO BF-4
- BID BOND FORM..... BBF-1 TO BBF-2
- TRIMBLE UNITY CONSTRUCT (E-BUILDER) USE
AGREEMENT..... EB-1
- SWORN STATEMENT, PUBLIC ENTITY CRIME PEC-1 TO PEC-2
- CERTIFICATION, SCRUTINIZED COMPANIES..... CCRSC-1
- E-VERIFY ACKNOWLEDGEMENT E-VERIFY

INVITATION TO BID
BIMT EQUIPMENT WASH FACILITY
BLOUNT ISLAND MARINE TERMINAL
JAXPORT PROJECT NO.: B2023-04
JAXPORT CONTRACT NO.: C-1965

October 24, 2024

Sealed bids will be received by JAXPORT up to **2:00 PM (ET)**, local time, **WEDNESDAY, DECEMBER 11, 2024** at which time they shall be opened via ZOOM at: <https://us02web.zoom.us/j/83252832323?pwd=AHzwBb35jQgGh5TSgysSIFXt9FG29i.1>, Meeting ID: **832 5283 2323**, Passcode: **673465**, for **BIMT EQUIPMENT WASH FACILITY**.

All bids must be submitted in accordance with specifications and drawings for Contract No. **C-1965**.

IT IS MANDATORY THAT THE BIDDER SHALL ACKNOWLEDGE THE INCLUSION OF ALL ADDENDA ON THE BID FORM, FORM BF. ACKNOWLEDGEMENT SHALL BE MADE BY INITIALS AND DATE. FAILURE TO ACKNOWLEDGE ALL ADDENDA MAY RESULT IN REJECTION OF THE BID.

PLEASE VISIT [HTTPS://WWW.JAXPORT.COM/PROCUREMENT/ACTIVE-SOLICITATIONS/](https://www.jaxport.com/procurement/active-solicitations/) PRIOR TO THE BID OPENING TO DETERMINE IF ANY ADDENDA HAVE BEEN RELEASED ON THIS CONTRACT.

A PRE-BID CONFERENCE AND SITE VISIT WILL BE HELD ON **THURSDAY, NOVEMBER 7, 2024, AT 10:00 AM (ET)**, ZOOM AT: <https://us02web.zoom.us/j/85374216739?pwd=N8ki46ZYc7h3G6NqEY8Y6aNiBAmdY6.1>, Meeting ID: **853 7421 6739**, Passcode: **029565**.

A Site Visit is scheduled for **THURSDAY, NOVEMBER 7, 2024 at 2:00 PM (ET)**

ATTENDANCE BY A REPRESENTATIVE OF EACH PROSPECTIVE BIDDER IS ENCOURAGED.

Bid and contract bonds are required.

This project is funded by JAXPORT.

The mandatory SEB Participation Goal established for this project is **100% Set-Aside** (JSEB's, MBE's, WBE's, DBE's and SBA's).

Retta Rogers
Director, Procurement Services
JAXPORT

BID CONTENTS AND FORMAT

BIMT EQUIPMENT WASH FACILITY

Interested bidders shall prepare and electronically submit, a bid package consisting of bidder's requirements (a-i), signed FORM BF and any other technical information required in order to be considered for award of this project. JAXPORT no longer accepts any bid packages submitted by mail or hand-delivery. Please visit the JAXPORT's website at www.jaxport.com for more information and updates. Bids received via email, fax or hand delivery will be declared nonconforming and will not be read or accepted.

1. BIDDER REQUIREMENTS FOR CONTRACT NO.: **C-1965**

NAME OF FIRM: _____

The electronically submitted documents shall contain the following information:

- a. Bid bond, certified check or cashier's check for 5 percent of the amount of the bid (See Article 6 in Supplemental Instructions to Bidders).
- b. Form COI, "Conflict of Interest Certificate" statement.
- c. Form PEC, "Sworn Statement on Public Entity Crime."
- d. Bidders Representation and Authorization – Written Statement (Only if necessary).
- e. Form MR, "Bidders Minimum Requirements" (See Article 4 in Supplemental Instructions to Bidders).
- f. Form CCRSC, "Contractor Certification Regarding Scrutinized Companies."
- g. Form E-Verify, "Acknowledgement and Acceptance of E-Verify Compliance."
- h. Form EB-1 "Trimble Unity Construct (E-Builder) User Agreement".
- i. SEB Form 1, "Schedule of Subcontractor/Sub-consultant Participation."

2. **Signed FORM BF, and any technical information required** to be submitted by the specifications.

Alternatively, the entire bid package must be submitted in **PDF format only** through Trimble Unity Construct (E-Builder) Electronic Bid Submission, in sufficient time to ensure receipt prior to the time specified below.

Bids must be submitted prior to 2:00 PM (ET), WEDNESDAY, DECEMBER 11, 2024. The submit button will deactivate at exactly 2:00 PM and you will not be permitted to submit your bid regardless of where you are in the process. Please plan accordingly.

The PDF file name(s) should read "**C-1965.**" "How to Submit Your Bid Response in Trimble Unity Construct (E-Builder)" is provided as "Attachment No. 1." Additional instructions on how to navigate in Trimble Unity Construct (E-Builder), click the below link to access the "**Bidders Portal Instructional Training Video**":

<https://videos.trimble.com/construction/watch/NeQt4akFyjUaS6PhYeyQKw>

It is the sole responsibility of the Bidder to have its bid submitted to JAXPORT as specified herein before the aforementioned date and time. For the purpose of the ITB, a Bid is considered delivered when confirmation of delivery is provided by Trimble Unity Construct (E-Builder). Bidders must ensure that its electronic submission in Trimble Unity Construct (E-Builder) can be assessed and viewed at the time of the Bid Opening. JAXPORT will consider any file that cannot be immediately accessed and viewed at the time of the Bid Opening (including, but not limited to encrypted files, password protected files, or incompatible files) to be blank or incomplete, as context requires, and, therefore, unacceptable. Bidders will not be permitted to unencrypt files, remove password protections, or resubmit documents after Bid Opening to make a file viewable if those documents are required with Bid. All expenses for submitting Bids to JAXPORT are to be borne by the Bidder and will not be borne, charged to or reimbursed by JAXPORT in any manner or under any circumstance.

If your firm does not intend to submit a bid for this project, please complete Form NB and fax to (904) 357-3077 or e-mail to Jerrie.Gunder@JAXPORT.com

"NO BID" RESPONSE

BIMT EQUIPMENT WASH FACILITY

PROJECT: **BIMT EQUIPMENT WASH FACILITY**

CONTRACT NO. **C-1965**

BID OPENING DATE: **Wednesday, December 11, 2024** TIME: **2:00 PM (ET)**

If your firm does not intend to submit a bid for this project, please provide us with the information requested below and fax to (904) 357-3077 or e-mail to Jerrie.Gunder@JAXPORT.com

NAME OF FIRM: _____

We are unable to submit a bid for this project for the following reasons:

SIGNATURE: _____

TITLE: _____

TELEPHONE: ()

We () are / () are not interested in bidding on similar JAXPORT projects in the future.

SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

BIMT EQUIPMENT WASH FACILITY

ARTICLE	TITLE	PAGE NO.
1.	Authentication of Bid Form	SIB-2
2.	Award of Contract	SIB-2
3.	Bid Amendments	SIB-2
4.	Bidders Minimum Requirements	SIB-3
5.	Bid Form	SIB-3
6.	Bid Guaranty	SIB-4
7.	Bid Opening – Procedure	SIB-4
8.	Examination of Drawings, Specifications, and Site of Work	SIB-4
9.	Execution of the Agreement	SIB-5
10.	Failure to Execute the Agreement	SIB-5
11.	Familiarity with Laws	SIB-5
12.	Florida State Sales Tax	SIB-5
13.	Omissions, Discrepancies and Addenda	SIB-5
14.	Protest Procedures	SIB-6
15.	Public Meeting Requirements	SIB-6
16.	Requirements of the Bidders	SIB-6
17.	Statements By Bidders	SIB-6
18.	E-Verify Program for Employment Verification.....	SIB-10
19.	Small & Emerging Business Participation Goal.....	SIB-10
20.	Public Records	SIB-11
21.	Security Implementation Procedure	SIB-12
22.	Electronic Data Requirements Trimble Unity Construct (E-Builder)..	SIB-18

SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

BIMT EQUIPMENT WASH FACILITY

1. AUTHENTICATION OF BID FORM

All bids submitted for this project shall be signed as outlined below. **FAILURE ON THE PART OF THE INDIVIDUAL, PARTNERSHIP OR CORPORATION TO SIGN THE BID, FORM BF, WILL CONSTITUTE A MATERIAL IRREGULARITY AND SHALL RESULT IN THE REJECTION OF THE BID.**

- a. If made by an individual, Form BF shall show the name and business address of the individual or firm and shall be signed by the individual or authorized representative of the individual.
- b. If made by a partnership, Form BF shall show the name and business address of the partnership and shall be signed by a partner or authorized representative of the partnership.
- c. If made by a corporation, Form BF shall show the name and business address of the corporation and shall be signed by an officer or an authorized representative of the corporation.

2. AWARD OF CONTRACT

JAXPORT reserves the right to award this contract to the lowest, responsive, responsible bidder, whose bid is fully conforming to the requirements of the bid documents. Nevertheless, JAXPORT reserves the right to waive informalities and minor irregularities in any bid, to reject any or all bids, and to accept the bid, which in its judgment, will be in the best interest of JAXPORT. JAXPORT will be the sole judge of which proposal will be in its best interest and its decision will be final.

JAXPORT reserves the right to award this contract to the bidder offering the lowest price consistent with meeting all specifications, terms, conditions, delivery requirements set forth on this bid. No award will be made until all necessary inquiries have been made into the responsibility of the lowest conforming bidder and JAXPORT is satisfied that the lowest bidder met all the requirements, is qualified and has the necessary organization, capital and resources required to perform the work under the terms and conditions of the contract. JAXPORT reserves the right to accept or reject any or all proposals, in whole or in part.

3. BID AMENDMENTS

Bid price amendments are permissible if received by JAXPORT Procurement Services, via Trimble Unity Construct (E-Builder) electronic submission, prior to the bid opening time stated in the "[Invitation to Bid](#)."

Refer to **Attachment No. 1** "How to Submit Your Bid Response in Trimble Unity Construct (E-Builder)" for additional instructions on how to navigate in Trimble Unity Construct (E-Builder). Click the below link to access the "**Bidders Portal Instructional Training Video**":

SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

BIMT EQUIPMENT WASH FACILITY

<https://videos.trimble.com/construction/watch/NeQt4akFyjUaS6PhYeyQKw>

It is the responsibility of the individual, partnership, or corporation submitting the bid to ensure that any amendment, is made prior to the bid opening time stated in the "Invitation to Bid." JAXPORT accepts no responsibility for late amendments, and bidders shall not be permitted to modify their bids after the specified time for the bid opening. EMAIL, MAIL AND FACSIMILE TRANSMISSION OF AMENDMENTS TO JAXPORT WILL NOT BE ACCEPTED.

All amendments must be signed by an individual authorized to sign the bid. An unsigned amendment shall be considered nonconforming and will therefore cause the amendment to be rejected. No amendment shall be withdrawn after the closing date and time specified herein.

4. BIDDERS MINIMUM REQUIREMENTS

Contractors are required to upload via Trimble Unity Construct (E-Builder) Electronic Bid Submission FORM MR, "BIDDERS MINIMUM REQUIREMENTS," and include it as part of the "BIDDER REQUIREMENTS" (see section "Bid Contents and Format"). Before an award is made, Minimum Requirements of the apparent low conforming bidders will be examined to determine the Contractor's financial responsibility and work history, experience and current workload. Additional information may be requested if JAXPORT considers it necessary to make a proper evaluation. Based on the review of the Contractor's financial condition, previous experience, current workload or any other information included on BIDDERS MINIMUM REQUIREMENTS or subsequently requested from the Contractor, JAXPORT reserves the right to reject any Contractor's bid, should, in JAXPORT's sole judgment, the Contractor is or appears to be unqualified or incapable of successfully completing the project in a timely manner.

The Minimum Requirements requires a financial statement as outlined in Section 119.071, Florida Statutes, and provides:

"Any financial statement which an agency requires a prospective bidder to submit in order to pre-qualify for bidding or for responding to a proposal for a road or any other public works' project is exempt from s. 119.071 (1c) and s.24(a), Art. I of the State Constitution."

5. BID FORM

The bidder shall submit the bid on Bid Form BF furnished herein. If additional forms are required, they may be secured from JAXPORT or may be duplicated. The bidder shall state the price, typewritten or written in ink, in numerals, for which the bidder proposes to do each item of work. See "BID CONTENTS AND FORMAT" section for more details.

NOTE: IT IS MANDATORY THAT THE BIDDER SHALL ACKNOWLEDGE THE INCLUSION OF ALL ADDENDA ON THE BID FORM, FORM BF. ACKNOWLEDGEMENT SHALL BE MADE BY INITIALS AND DATE. FAILURE TO

SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

BIMT EQUIPMENT WASH FACILITY

ACKNOWLEDGE ALL ADDENDA MAY RESULT IN REJECTION OF THE BID.

PLEASE VISIT [HTTPS://WWW.JAXPORT.COM/PROCUREMENT/ACTIVE-SOLICITATIONS/](https://www.jaxport.com/procurement/active-solicitations/) PRIOR TO THE BID OPENING TO DETERMINE IF ANY ADDENDA HAVE BEEN RELEASED ON THIS CONTRACT.

6. BID GUARANTY

Each bidder shall furnish with the bid a bid bond in an amount not less than **5** percent of the total bid, as a guaranty that the bid will not be withdrawn for a period of **90** calendar days after opening of bids. As soon as practicable after the opening of bids, any checks submitted as guaranty by bidders who are not among the three lowest cost, responsive, responsible bidders will be returned. Checks submitted by the remaining bidders will be returned after execution of the Agreement and submittal of the required bonds by the successful bidder.

If contract bond is not furnished within the time stated herein, the bid guaranty will be forfeited and the contract may be awarded the next low conforming bidder. **THE BID BOND MUST BE SECURED FROM AND EXECUTED BY AN AGENCY DULY-LICENSED TO DO BUSINESS IN THE STATE OF FLORIDA, PURSUANT TO CHAPTER 255 OF THE FLORIDA STATUTES, SECTION 255.05. FAILURE TO FURNISH THE BID GUARANTY, INCLUDING POWER OF ATTORNEY, IF REQUIRED, WILL CONSTITUTE A MATERIAL IRREGULARITY AND SHALL RESULT IN THE REJECTION OF THE BID.**

If a bid bond is used, it shall be written through a Surety bond agency and with a Surety company meeting the same specifications as those required for contract bonds.

The bid bond provided by the Owner of the Property/Contracting Public Entity may be utilized (see Form BBF). Surety's standard bond form for State of Florida is acceptable. Refer also to "Surety Bonds" of the "General Conditions".

7. BID OPENING - PROCEDURE

At the time and place stated in the "Invitation to Bid," JAXPORT's representative will announce the close of bidding and commence with the Bid Opening. Bidders are invited to attend the **ZOOM Meeting** proceedings .

The Bidder's name and the total amount used for basis of award will be the only information read aloud.

8. EXAMINATION OF DRAWINGS, SPECIFICATIONS, AND SITE OF WORK

The bidder is advised, before submitting a bid, to visit the site of the proposed work and become familiar with the nature and extent of the work and any local conditions that may in any manner affect the work to be done, and equipment, materials, and labor required. The bidder is required to examine carefully the drawings and specifications and contract forms, and to be informed regarding any and all conditions and requirements contained

SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

BIMT EQUIPMENT WASH FACILITY

herein that may in any manner affect the work to be performed. No allowances will be made for conditions overlooked or ignored by the bidder.

9. EXECUTION OF THE AGREEMENT

The individual, firm, or corporation to which the contract has been awarded shall sign the Agreement and return it within ten (10) calendar days after receipt from JAXPORT.

10. FAILURE TO EXECUTE THE AGREEMENT

Failure on the part of the successful bidder to execute the Agreement as required will be just cause for the annulment of the award, and in the event of the revocation of the award, the bidder shall forfeit the Bid Guaranty. This forfeiture shall not be construed as a penalty, but as reasonable, fixed and liquidated damages because of the bidder's failure to enter into contract with JAXPORT.

11. FAMILIARITY WITH LAWS

The bidder shall be familiar and comply with all Federal, State, and local laws, ordinances, rules and regulations that in any manner affect the work. Lack of such knowledge on the part of the bidder will in no way relieve the bidder from any responsibility.

12. FLORIDA STATE SALES TAX

It is the bidder's sole responsibility to incorporate any and all applicable taxes into the bid. However, Chapter 212 of the Florida Statutes provides JAXPORT with sales tax exemption for all procurements made directly by JAXPORT. After a contract has been awarded, certain items which have been included in this bid may be purchased directly by JAXPORT in order to benefit from this tax savings program (See Special Conditions, Section 10, Tax Savings Program, General for more information).

13. OMISSIONS, DISCREPANCIES AND ADDENDA

- a. Should an omission or discrepancy be found in the bidding documents, or if there is any doubt as to the meaning, the bidder shall notify JAXPORT Procurement Services, in writing, in sufficient time in order that an addendum might be issued to all prospective bidders, if necessary.
- b. Any addenda issued by JAXPORT for the purposes of changing the intent of the plans and specifications or clarifying the meaning of same shall be binding in the same way as if written in the specifications. All addenda will be issued by Procurement Services prior to the bid opening. It is each bidder's sole responsibility to verify they have received all addenda in sufficient time to properly evaluate their contents before submitting a bid. It is the usual practice for JAXPORT to email addenda to known prospective bidders, but JAXPORT does not guarantee that all bidders will receive addenda in this

SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

BIMT EQUIPMENT WASH FACILITY

manner in due time before the bid opening.

- c. It is mandatory that the bidder shall acknowledge the inclusion of all addenda on the bid form, FORM BF. Acknowledgement shall be by initials and date. Failure to acknowledge all addenda may result in rejection of the bid.

14. PROTEST PROCEDURES

Respondents shall file any protest regarding this RFP in writing, in accordance with JAXPORT's Protest Procedures promulgated on SOP-1215 Procurement Code for the Jacksonville Port Authority, available at <https://www.jaxport.com/procurement/>

15. PUBLIC MEETING REQUIREMENTS

JAXPORT complies with Section 286.011 of the Florida Statutes. Therefore, certain types of staff meetings and meetings of JAXPORT Awards Committee, and Board of Directors are required to be held in public, with sufficient notice made of the time and date of the meeting(s). All notices of public meetings are posted in the lobby of JAXPORT, 2831 Talleyrand Avenue, Jacksonville, FL 32206 and on JAXPORT's website at www.jaxport.com. For information concerning when the project(s) will be submitted for award, contact JAXPORT Procurement Services at telephone (904) 357-3017, Monday through Friday.

16. REQUIREMENTS OF THE BIDDERS

The successful bidder shall hold a current Contractor's certificate for the type of work to be performed, if it is required by JAXPORT and under applicable law. Evidence of such certificate shall be presented before contract award, or it may be requested with the Bidder's REQUIREMENTS at the time of bid.

In addition, Plumbing and Electrical Contractors and Subcontractors shall be required to hold current certificates issued by the City of Jacksonville qualifying them to perform such work. Chapter 489.103, Florida Statutes, provides that Contractors involved in work on bridges, roads, highways, railroads, or utilities and services incidental thereto, and certain specialties are exempt from licensing by the State of Florida. The Florida Department of Business and Professional Regulation, advises that wharves, airfield pavements, and fences are included among the specialties which are exempt from licensing.

17. STATEMENTS BY BIDDERS

- a. **CONFLICT OF INTEREST** - Pursuant to Chapter 112 of the Florida Statutes, Bidders are required to complete and submit with their bids a "Conflict of Interest" statement. Form COI is provided in the bid documents for that purpose and must be included as part of the "BIDDER REQUIREMENTS" at the time bids are submitted.

Subcontractors, Vendors, and Suppliers selected by JAXPORT to participate in the Tax Savings Program will be required to submit Conflict of Interest

SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

BIMT EQUIPMENT WASH FACILITY

statements prior to any Purchase Orders being issued. The Prime Contractor shall be responsible for obtaining those statements from Subcontractors, Vendors and Suppliers and providing same to JAXPORT in a timely manner. Refer to the "Special Conditions" entitled, "Tax Savings Program – General" of the contract documents for more details on the Tax Savings Program.

- b. **PUBLIC ENTITY CRIME** - Pursuant to Chapter 287 of the Florida Statutes, Bidders are required to complete and submit with their bids a Sworn Statement Pursuant to Section 287.133 (3) (a), Florida Statutes, on Public Entity Crimes. Form PEC is provided in the bid documents for that purpose and must be included as part of the "BIDDER REQUIREMENTS" at the time bids are submitted.

A person or affiliate placed on the convicted vendor list following a conviction for a public entity crime is prohibited from doing any of the following for a period of 36 months from the date of being placed on the convicted vendor list:

- Submitting a bid on a contract to provide any goods or services to a public entity;
- Submitting a bid on a contract with a public entity for the construction or repair of a public building or public work;
- Submitting bids on leases of real property to a public entity;
- Being awarded or performing work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity; and
- Transacting business with any public entity in excess of Category Two threshold amount (\$35,000) provided in section 287.017 of the Florida Statutes.

- c. **DISCRIMINATORY VENDOR LIST** – An entity or affiliate placed on the discriminatory vendor list pursuant to section 287.134 of the Florida Statutes may not:

- Submit a bid on a contract to provide any goods or services to a public entity;
- Submit a bid on a contract with a public entity for the construction or repair of a public building or public work;
- Submit bids on leases of real property to a public entity;
- Be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity; or
- Transact business with any public entity.
- To view a current list, visit:

SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

BIMT EQUIPMENT WASH FACILITY

http://www.dms.myflorida.com/business_operations/state_purchasing/vendor_information/convicted_suspended_discriminatory_complaints_vendor_lists

- d. **BIDDERS REPRESENTATION AND AUTHORIZATION** – In submitting a bid, each Bidder understands, represents, and acknowledges the following (if the Bidder cannot so certify to any of the following, the Bidder shall submit with its response a written explanation of why it cannot do so).
- The Bidder is not currently under suspension or debarment by the State or any other governmental authority.
 - To the best of the knowledge of the person signing the bid documents, the Bidder, its affiliates, subsidiaries, directors, officers, and employees are not currently under investigation by any governmental authority and have not in the last ten (10) years been convicted or found liable for any act prohibited by law in any jurisdiction, involving conspiracy or collusion with respect to bidding on any public contract.
 - Bidder has not within the last five (5) years, had a delinquent obligation to the State or any other governmental authority, including a claim for liquidated damages under any other contract.
 - The bid submission is made in good faith and not pursuant to any agreement or discussion with, or inducement from, any firm or person to submit a complementary or other noncompetitive response.
 - The prices and amounts have been arrived at independently and without consultation, communication, or agreement with any other respondent or potential respondent; neither the prices nor amounts, actual or approximate, have been disclosed to any Bidder or potential Bidder, and they will not be disclosed before the solicitation bid opening.
 - The Bidder has fully informed the Buyer in writing of all convictions of the firm, its affiliates (as defined in section 287.133(1)(a) of the Florida Statutes), and all directors, officers, and employees of the firm and its affiliates for violation of state or federal antitrust laws with respect to a public contract for violation of any misrepresentation with respect to a public contract. This includes disclosure of the names of current employees who were convicted of contract crimes while in the employ of another company.
 - The product(s) offered by the Bidder will conform to the specifications without exception.
 - The Bidder has read and understands the Contract terms and conditions, and the submission is made in conformance with those terms and conditions.

SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

BIMT EQUIPMENT WASH FACILITY

- If an award is made to the Bidder, the Bidder agrees that it intends to be legally bound to the Contract that is formed with JAXPORT.
 - The Bidder has made a diligent inquiry of its employees and agents responsible for preparing, approving, or submitting the bid response, and has been advised by each of them that he or she has not participated in any communication, consultation, discussion, agreement, collusion, act or other conduct inconsistent with any of the statements and representations made in the response.
 - The respondent shall indemnify, defend, and hold harmless the Buyer and its employees against any cost, damage, or expense which may be incurred or be caused by any error in the respondent's preparation of its bid.
 - All information provided by, and representations made by, the Bidder are material and important and will be relied upon by the Buyer in awarding the Contract. Any misstatement shall be treated as fraudulent concealment from the Buyer of the true facts relating to submission of the bid. A misrepresentation shall be punishable under law, including, but not limited to, Chapter 817 of the Florida Statutes.
 - That the Bidder has carefully examined the site of the work and that from his/her investigations has been satisfied as to the nature and location of the work, the kind and extent of the equipment and other facilities needed for the performance of the work, the general and local conditions, all difficulties to be encountered, and all other items which in any way affect the work or its performance.
 - That the Bidder is in full compliance with all federal, state, and local laws and regulations and shall fully comply with the same during the entire term of the contract.
- e. **SCRUTINIZED COMPANIES – ACTIVITIES IN SUDAN AND/OR IRAN**
Section 287.135 of the Florida Statutes prohibits agencies from contracting with a company on the Scrutinized Companies with Activities in Sudan List or on the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, lists created pursuant to section 215.473, Florida Statutes, for goods or services over \$1,000,000.

Bidders are required to complete and submit with their bids a Contractor Certification Regarding Scrutinized Companies, Form CCRSC is provided in the bid documents for that purpose and must be included in the "BIDDER REQUIREMENTS" envelope at the time bids are submitted.

Bidder must certify that it is not listed on either the Scrutinized Companies

SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

BIMT EQUIPMENT WASH FACILITY

with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, created pursuant to section 215.473, Florida Statutes. Pursuant to section 287.135(5), F.S., Contractor agrees JAXPORT may terminate this contract immediately without penalty if the Contractor is found to have submitted a false certification or if Contractor is placed on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List.

18. E-VERIFY PROGRAM FOR EMPLOYMENT VERIFICATION

The successful bidder agrees to utilize the U.S. Department of Homeland Security's E-Verify system to verify the employment eligibility of all new employees hired by the contractor during the term of this contract. Successful bidders must include in all subcontracts the requirement that subcontractors performing work or providing goods and services utilize the E-Verify system to verify the employment eligibility of all new employees hired by the subcontractor during the contract term. The successful bidder further agrees to maintain records of its participation and compliance and its subcontractor's participation and compliance with the provisions of the E-Verify program, and to make such records available to JAXPORT upon request. Failure to comply with this requirement will be considered a material breach of the contract.

19. SMALL & EMERGING BUSINESS (SEB) PARTICIPATION GOAL IS 100% SET-ASIDE.

The Authority has determined that the SEB participation is Set-Aside 100% (JSEB's, MBE's, WBE's, DBE's and SBA's) for this project. SEB participation in the specified percentage must be met in order to satisfy this requirement, or good faith efforts submitted to demonstrate why the goal could not be achieved, in accordance with ARTICLE V, Section 5.10.

Contractors will take all necessary affirmative steps to ensure that minority firms, women's business enterprises, and labor surplus area firms are used when possible.

- Small Business Firms – Designated by the Small Business Administration.
- Minority Business Firms – 51% Minority Owner/Operated.
- Women's Business Enterprises – Small business that is at least 51% owned by a woman or women.
- Labor Surplus Area Firms – Firms geographically located in distressed labor surplus areas designated by the Secretary of Labor

Contractors shall ensure the following actions are taken in dealing with the above listed firms:

SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

BIMT EQUIPMENT WASH FACILITY

1. Placement on Bidders List;
2. Ensuring that solicitations are mailed
3. Allocating requirements into smaller amounts, when feasible, to permit maximum participation;
4. Establishing delivery requirements, when feasible, for compatibility with capability of the above-listed firms;
5. Using the services of the Small Business Administration, and
6. When subcontracts are considered, the Contractors will take these steps (1-5) for subcontracts.

20. PUBLIC RECORDS

In accordance with Section 119.0701, Florida Statutes, the Contractor shall:

- (a) Keep and maintain public records required by JAXPORT to perform the services; and
- (b) Upon request from JAXPORT's custodian of public records, provide JAXPORT with a copy of the requested records or allow records to be inspected or copied within a reasonable time at a cost that does not exceed the cost provided for in Chapter 119, Florida Statutes, or as otherwise provided by law; and
- (c) Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law for the duration of the Contract term and following completion of this Contract if Contractor does not transfer the records to JAXPORT; and
- (d) Upon completion of this Contract, transfer to JAXPORT at no cost all public records in possession of Contractor or keep and maintain public records required by JAXPORT to perform the service. If Contractor transfers all public records to JAXPORT upon completion of this Contract, Contractor shall destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. If Contractor keeps and maintains public records upon completion of this Contract, Contractor shall meet all applicable requirements for retaining public records. All records stored electronically must be provided to JAXPORT upon request from JAXPORT's custodian of public records in a format that is compatible with JAXPORT's information technology systems.

The above requirements apply to a "Contractor" as defined in Section, 119.0701, Florida Statutes.

SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

BIMT EQUIPMENT WASH FACILITY

IF CONTRACTOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, IT IS THE CONTRACTOR'S DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THIS CONTRACT. CONTACT JAXPORT'S CUSTODIAN OF PUBLIC RECORDS AT (904) 357-3091 public.records@jaxport.com; JACKSONVILLE PORT AUTHORITY, PUBLIC RECORDS REQUEST, 2831 TALLEYRAND AVENUE, JACKSONVILLE, FLORIDA 32206.

21. SECURITY IMPLEMENTATION PROCEDURE

JAXPORT's rigid security standards include the Federal Transportation Worker Identification Credential (TWIC) program, which is administered by the Transportation Security Administration. The TWIC is required for unescorted access to all JAXPORT terminals. It is your responsibility as the Prime Contractor to ensure that all of your employees and sub-contract personnel working for your company have been properly screened and credentialed with the TWIC, and the JAXPORT Business Purpose Credential.

Transportation Worker Identification Credential (TWIC)

The TWIC is required for all Prime Contractor/Sub-Contractor employees working on the job site for this Contract. This credential is for all personnel requiring unescorted access to secure-restricted areas of Maritime Transportation Security Act (MTSA)-regulated facilities. TSA will issue a tamper-resistant "Smart Card" containing the person's biometric (fingerprint template) to allow for a positive link between the card and the individual.

The fee for obtaining each TWIC® is \$125.25, and the credential is valid for five years. The pre-enrollment process can be initiated online at <https://universalenroll.dhs.gov/> or at an IdentoGo TSA's Universal Enrollment Service Center.

TWIC: Universal Enrollment Centers

The Jacksonville Universal Enrollment Center is located at: 2121 Corporate Square Blvd. Building A, Suite 165, Jacksonville, FL 32216. The office hours are Monday-Friday: 09:00 AM –11:00AM / 12:00PM- 6:00 PM, For general information you can call the TWIC Call Center at 1-855-347-8371, Monday-Friday, 8 a.m. to 10 p.m. Eastern Time.

JAXPORT Business Purpose Credential

In addition to the TWIC, JAXPORT requires a JAXPORT Business Purpose Credential to be issued and registered at JAXPORT's Access Control Center located at the 9620 Dave Rawls Blvd. Jacksonville Fl. 32226 (Brick Building next to the Main Gate concourse). Hours of operation are Monday-Friday 7:30AM-4:30PM. The JAXPORT Business Purpose Credential is issued at no cost but expires at the end of the contract provisions.

The JAXPORT prime contractor is responsible for sponsoring all sub-contractors for the JAXPORT Business Purpose Credential.

SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

BIMT EQUIPMENT WASH FACILITY

Federal Training Requirement: (33CFR 105.215) Maritime Security Awareness Training

JAXPORT is a federally regulated facility under the Maritime Transportation Security Act of 2002 (MTSA) as codified under the US Code of Federal Regulation 33 CFR Chapter 1, Subchapter H Part 105.

33 CFR 105.215-Security training for all other facility personnel. All other facility personnel, including contractors, whether part-time, full-time, temporary, or permanent, must have knowledge of Maritime security measures and relevant aspects of the TWIC program, through training or equivalent job experience.

To meet the requirements of 33 CFR 105.215; the Prime Contractor/Sub-Contractor employees and all support personnel: Engineers, Suppliers, Truck Drivers, Laborers, Delivery persons etc. (NO EXCEPTIONS) are required to attend JAXPORT's Maritime Security Training given every Wednesday (10am, 2pm & 5pm) at JAXPORT's Access Control Building. Contact the JAXPORT Access Control Center to arrange for the training. JAXPORT will work with Contractors to conduct timely Maritime Security Training classes for larger groups.

All Prime Contractor/Sub-Contractor employees working on the job site for JAXPORT are required to attend JAXPORT's 33 CFR 105.215 (Security/Safety Training for All Other Facility Personnel) class at a cost of \$35.00 per person. Arraignments can be made by calling JAXPORT Access Control Phone# (904) 357-3344.

TWIC Escort Provisions

To ensure contractors can begin work after they receive a Notice to Proceed, JAXPORT will allow prime contractors to have dedicated employee TWIC Escort(s) to handle those contractor employees who have not yet received their TWIC. Escorted employees must have a TWIC receipt validated by Access Control to receive a temporary JAXPORT Business Purpose credential.

Contractor deliveries from -TWIC vendors may be escorted by JAXPORT approved Prime Contractor escorts. The prime contractor will be required to submit a request for TWIC Escort privileges to accesscontrol@jaxport.com . Once approved, the contractor's employee(s) will attend a JAXPORT provided MTSA TWIC Escort Class in addition to the standard MTSA 33 CFR 105.215 Security Class at a combined cost of \$55.00. **These authorized individual(s) must have no collateral duties that will separate the escort from the escorted visitor while serving as escort.** Note - Limitations to the number of TWIC Escort authorizations will be set by the JAXPORT Public Safety Department.

Truck drivers, vendors, labor may not conduct escorts.

A Contractor authorized by JAXPORT to conduct an escort of a non-TWIC holder in a restricted area must have:

SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

BIMT EQUIPMENT WASH FACILITY

- Successfully completed MTSA 33 CFR 105.215 Security/ Escort Class at \$55.00
- Have a valid TWIC on their person
- Have an approved JAXPORT TWIC ESCORT credential on their person
- Have a tamper-resistant laminated government issued photo identification card on their person.

TWIC Escorts must complete the JAXPORT TWIC Escort Form daily before getting to the access gate. The form will be kept on file at the JAXPORT Security Operations Center (SOC).

The Prime Contractor assumes full liability for the escorted person(s) while on JAXPORT property. The person under escort must have a continuous side by side escort in a secure-restricted area. Federally (USCG / TSA) imposed fines and or consequential damages resulting from a failed TWIC Escort by the Prime or Sub-contractor will be the responsibility of the JAXPORT Prime Contractor regardless of whether it is a direct employee.

Federal regulation definition: 33.CFR 101.105

Escorting means: ensuring that the escorted individual is continuously accompanied while within a secure area in a manner sufficient to observe whether the escorted individual is engaged in activities other than those for which escorted access was granted. This may be accomplished via having side-by-side companion or monitoring, depending upon where the escorted individual will be granted access. Individuals without TWIC may not enter restricted areas without having an individual who holds a TWIC as a side-by-side companion.

JAXPORT TWIC ESCORTS

JAXPORT may provide TWIC escorts at Tariff rate with advanced notice (Minimum 24 hours).

After review of the Contractors operation; JAXPORT will decide the number of escorts required to meet the federal regulation ratios of TWIC escort per non-TWIC worker. This will be based on operational requirements.

JAXPORT TWIC Escort Tariff Fees are published in JAXPORT's Tariff Schedule. Current rates are: **Mon.-Fri. 7:00 a.m. until 6:00 p.m.** Subject to two hour minimum \$125.00 first two hours; \$125.00 each additional two-hour block thereafter.

After 6:00 p.m. until 7:00 a.m. weekends, holidays Subject to two hours minimum \$250.00; \$125.00 each additional two-hour block thereafter.

Examples:

1. One TWIC Escort for an 8-hour day is \$501.00 (= 4 TWIC Credentials)
2. One TWIC Escort for 1 5-day work week is \$2505.00 (= 20 TWIC Credentials)

SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

BIMT EQUIPMENT WASH FACILITY

NOTE:

- All persons entering JAXPORT under TWIC Escort are required to have a tamper-resistant laminated government issued photo identification card on their person. The Identification Card must meet the USCG MTSA standards of 33 CFR 101.515. (State issued paper temporary drivers licenses are not acceptable identification).
- Any violations of the JAXPORT USCG approved Facility Security Plans will result in a Security Violation Hearing and be subject to temporary or permanent denial of access onto JAXPORT Terminals or ability to TWIC Escort.

Significant Designations on Terminals

- The terms "secure area" and "restricted area" do not mean the same thing. A **secure area** is defined as "the area over which an owner/operator has implemented security measures for access control." A **restricted area** is defined as "the infrastructure or locations identified in an area, vessel or facility security assessment or by the operator that require limited access and a higher degree of security protection."
- Entry through the main gates at Blount Island Terminal (BIT) constitutes entry into a secure area; tenant-controlled properties are designated as restricted areas per their individual FSPs.
- Entry into the main gates at Talleyrand Marine Terminal (TMT) and Mitsui/TraPac (MOL) Terminal constitutes entry into a restricted area.
- Entry into the cruise terminal provisions gate, crew gate or terminal doors constitutes entry into a restricted area.

Escorts

Truck drivers, vendors, labor may not conduct escorts. The only exception will be given to the ILA President, Vice President and Business Agent when escorting for purposes other than labor.

Truck Drivers: Truck drivers at the gate with no TWIC and/or no escort into a restricted area, will be turned around and will be assisted by security traffic control to safely park until such time as the escort arrives. Truck drivers are responsible for making contact with their approved escort; JAXPORT security is not responsible for arranging or providing escorts. Escort must assume written custody of the driver. For cargo trucks, escorts may be in a vehicle providing the escort is able to visually observe the escorted at all times. This policy DOES NOT apply to POVs.

Contractors: Contractors without a JAXPORT badge and TWIC to access the port will be under escort as defined in this policy.

SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

BIMT EQUIPMENT WASH FACILITY

Contract Security (performing security duties): Must have a JAXPORT credential and a TWIC badge and may not be escorted.

Hired Escorts: Hired escorts would be commercial companies providing escort services for tenants in restricted areas; they must be sponsored by a tenant and may be vetted and approved with additional training and an administrative fee.

Vendors: Vendors without a TWIC will be turned away unless they have a dedicated & approved TWIC escort.

Visitors: According to Florida State Law, visitors without JAXPORT credentials may only visit five times in a 90-day period; this policy will remain in effect. Visitors should be vetted at least 24-hours in advance and await escort at the gate where they are seeking access. **A person with a TWIC badge, but without a JAXPORT credential will be treated as a "5/90" visitor.**

Vessel Crewmembers: When a vessel visits a JAXPORT terminal, the vessel's crew commonly needs to work in the immediate vicinity of their vessel (handling lines, taking draft readings, etc.). Some vessel crew may not have a TWIC, or they may not be U.S. Merchant Mariners. Although the dock, pier, or platform the vessel is moored to, is defined as a restricted area. There is no requirement to escort any of the vessel crewmembers that do not have a TWIC while they work alongside their vessel. **The area of dock directly adjacent to the vessel and extending in shore 18 feet from the vessel shall be designated the Crewmember Confinement Area (CCA).**

Vessel crewmembers may be escorted by approved escorts provided they complete the *TWIC Escort form* and escort under no more than a 1 to 3 ratio (excluding labor, contractors, and vendors). Prior to and upon completion of the escort, they are to contact the JAXPORT SOC at 904.357.3360.

Vessels, in coordination with the calling facility, shall ensure all crewmembers do not access Restricted Areas without approved escort. Any crewmember found outside the Crew Confinement Area (CCA) without a TWIC or approved escort may be considered a security breach under the JAXPORT FSP.

Seamen Center workers, ship's agents, etc who may pickup crewmembers outside the CCA must have TWIC Escort forms on hand and deliver them to the nearest facility gate once completed.

New Hire Provision: **If a new hire moves from a secured to a restricted access area, they require side-by-side escort by a TWIC holder at all times.** If an individual is a newly hired vessel or facility employee who has applied for but not yet received a TWIC, the owner/operator may grant the individual accompanied access to secure areas of the vessel or facility. This accompanied access may be granted for a period of up to 30 consecutive calendar days from the date of TWIC enrollment, after notification through Homeport that the individual has passed the name-based check. Accompanied access may be extended for an additional 30 days by the local COTP if TSA has not yet issued the new hire's TWIC.

SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

BIMT EQUIPMENT WASH FACILITY

Company/tenant/operator is responsible for reporting and verifying new hires via Homeport.

This provision **may not** be used to grant temporary accompanied access to an individual being hired as a CSO, VSO, or FSO or any individual being hired to perform security as a primary duty.

Rail Access

Rail Access: It is the Coast Guard's position that, due to the unique aspects of railroad operations that can impact security at MTSA facilities, all railroad crew servicing secure areas of a MTSA facility should possess a TWIC. The following applies at:

Blount Island Marine Terminal: CSX will contact JAXPORT SOC via e-mail in advance of train arrival on BIMT to report crew TWIC status; if a crewmember does not possess a TWIC, JAXPORT contract security will provide escort. At no time will JAXPORT contract security personnel board trains or cross train tracks.

Talleyrand Marine Terminal: All Railroad personnel entering TMT must be in possession of a TWIC.

Any violation of the JAXPORT TWIC rail policy will be treated as a security breach under the JAXPORT FSP.

Additional Comments:

The following standards must be met for escorting in the restricted areas of JAXPORT:

1. Escorts must have in their possession a valid TWIC and a permanent JAXPORT credential.
2. Visitors must have a verified reason to enter the restricted area.
3. Side by side escort requirement must be continual and uninterrupted.
4. The person escorting must be able to immediately contact JAXPORT Security Operations Center at (904.357.3360), as indicated on TWIC Escort Form.
5. JAXPORT Security must be notified if the side by side escort has been compromised or the non-TWIC holder engages in unlawful or suspicious activity.
6. Non-TWIC holders will not be allowed to occupy a privately-owned vehicle (POV) without a JAXPORT authorized escort.
7. TWIC Escort Form indicates Facility and FSO responsible for the action of the escorted & employees.

TWIC Helpdesk: 1-866-347-8942

SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

BIMT EQUIPMENT WASH FACILITY

22. ELECTRONIC DATA REQUIREMENTS TRIMBLE UNITY CONSTRUCT (E-BUILDER)

A. General Requirements:

- a) Contractor must purchase at a minimum one (1) user license (see Section 22. H. for details) from JAXPORT and shall provide at a minimum, the following to its staff:
 - i. Computer: Minimum Intel Pentium® 4 Processor 2.4 GHz or equivalent processor with 512MB of RAM; recommended Centrino Duo® Processors 1.6 GHz or equivalent with 2GB of RAM, or higher.
 - ii. Computer Operation System: Windows XP, Windows Vista, or Windows 7
 - iii. Web Browser: Microsoft Internet Explorer 9
 - iv. Work and Spreadsheet Processors: Microsoft Office Word, Excel and Outlook
 - v. Scheduling Software: Microsoft Project or Primavera
 - vi. Internet Service Provider: A reliable ISP in the area of the Project
 - vii. Connection Speed/Minimum Bandwidth: DSL, ADSL or T1 Line for transferring a minimum of 3 Mbps Downstream and 512 Kbps Upstream
- b) Contractor shall provide its management personnel assigned to this Project with access to personal computers and the Internet on a daily basis.

B. Project Web Requirements; Use of Trimble Unity Construct (E-Builder) Enterprise:

This project will utilize a web based project management tool called Trimble Unity Construct (E-Builder) Enterprise™. This web based application is a collaboration tool, which will allow all project team members continuous access through the Internet to important project data as well as up to the minute decision and approval status information.

Contractor shall conduct Project controls, outlined by JAXPORT, Design Firm (EoR), and the Project Manager, utilizing Trimble Unity Construct (E-Builder) Enterprise™. No additional software will be required. Furthermore, JAXPORT'S Engineering and Construction Department will assist Contractor in providing training of personnel.

Contractor shall have the responsibility for visiting the Project web site on a daily basis, and as necessary to be kept fully apprised of Project developments, for

SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

BIMT EQUIPMENT WASH FACILITY

correspondence, assigned tasks and other matters that transpire on the site. These may include but are not limited to: Contracts, Contract Exhibits, Contract Amendments, Drawing Issuances, Addenda, Bulletins, Permits, Insurance & Bonds, Safety Program Procedures, Safety Notices, Accident Reports, Personnel Injury Reports, Schedules, Site Logistics, Progress Reports, Daily Logs, Non-Conformance Notices, Quality Control Notices, Punch Lists, Meeting Minutes, Requests for Information, Submittal Packages, Substitution Requests, Monthly Payment Request Applications, Supplemental Instructions, Construction Variation Directives, Potential Variation Orders, Variation Order Requests, Variation Orders, and the like. All supporting data including but not limited to shop drawings, product data sheets, manufacturer data sheets and instructions, method statements, safety MSDS sheets, Substitution Requests and the like will be submitted in digital format via Trimble Unity Construct (E-Builder) Enterprise™.

C. Electronic File Requirements:

In addition to the standard closeout submittal requirements detailed elsewhere in the Contract Documents, the Contractor shall also submit all closeout documents including all "As-Built Drawings", catalog cuts and Owner's Operation and Maintenance manuals in digital format. All documents (including as-built drawings) shall be converted or scanned into the Adobe Acrobat (.PDF) file format and uploaded to Trimble Unity Construct (E-Builder) Enterprise™.

Trimble Unity Construct (E-Builder) Enterprise™ is a comprehensive Project and Program Management system that JAXPORT will be implementing for managing documents, communications and costs between the Contractor, Design Consultants and Owner. Trimble Unity Construct (E-Builder) Enterprise™ includes extensive reporting capabilities to facilitate detailed project reporting in a web-based environment that is accessible to all parties and easy to use.

D. Central Document Vault:

Trimble Unity Construct (E-Builder) Enterprise™ system includes a central database that maintains all project information and manages project communications amongst team members.

E. Communication/Correspondence:

Trimble Unity Construct (E-Builder) provides electronic routable communication forms that provide historical tracking, documentation, and increased accountability of project members.

F. Project Calendars:

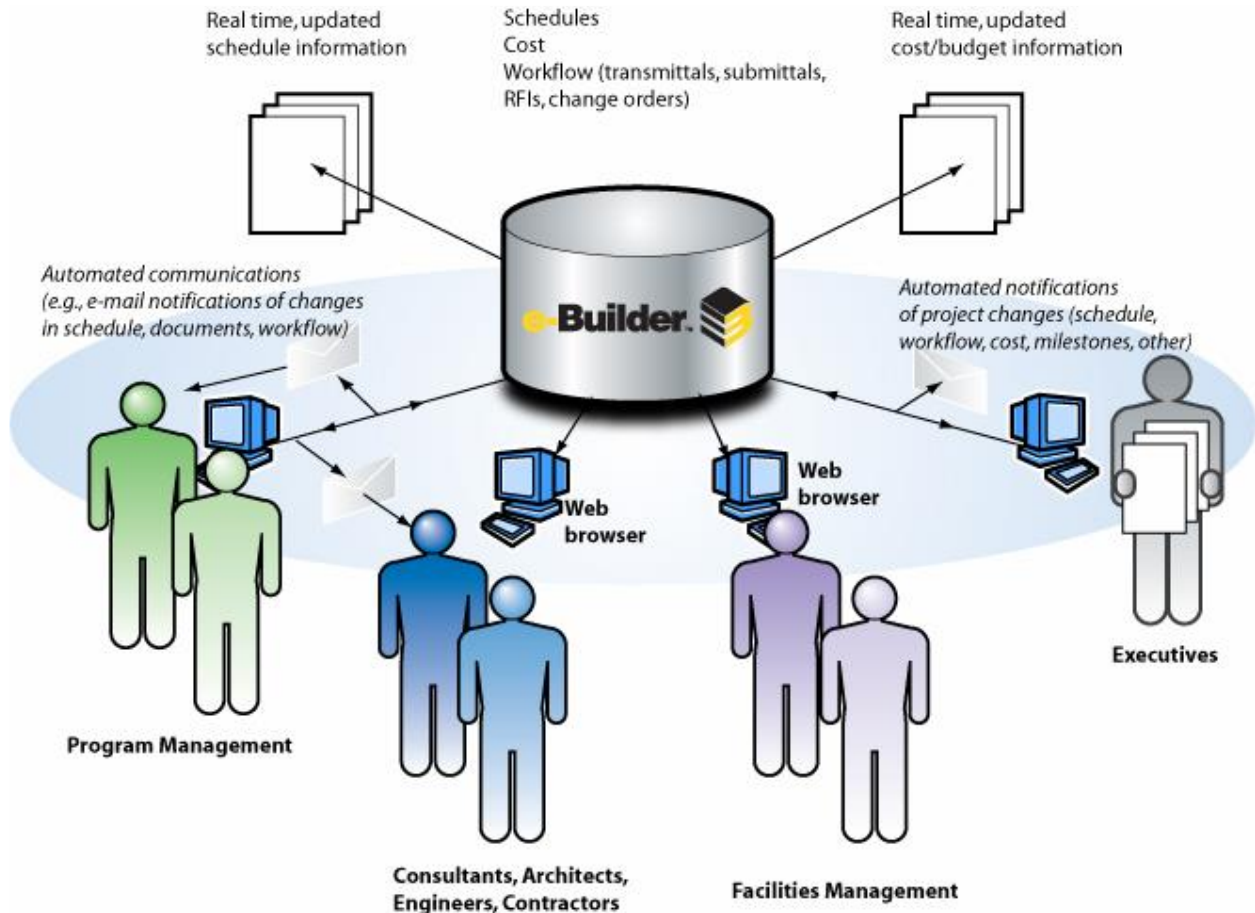
Meetings will be scheduled and maintained centrally on Trimble Unity Construct (E-Builder) Enterprise™.

SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

BIMT EQUIPMENT WASH FACILITY

G. Reporting:

All of the project and program data including documents, communications and costs are accessible through integrated online reports. These reporting tools are completely configurable by each user. All reports can be exported to Excel for added flexibility.



TRIMBLE UNITY CONSTRUCT (E-BUILDER) LICENSING REQUIREMENTS

H. Trimble Unity Construct (E-Builder) Enterprise™ User Licenses:

Each user license includes full access to Trimble Unity Construct (E-Builder) Enterprise™ including all of the documents and reports mentioned above. Furthermore, each user license provides the Trimble Unity Construct (E-Builder) software as a service (SaS) including:

- All hosting, operation, maintenance and data backup of the Trimble Unity Construct (E-Builder) Enterprise™ software and documents which are

SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

BIMT EQUIPMENT WASH FACILITY

maintained in state-of-the-art data centers located throughout the United States.

- Quarterly Trimble Unity Construct (E-Builder) Enterprise™ software enhancements
- Unlimited phone, email and web-based support 24-hours:

The cost for licenses that the Contractor will need to acquire will be \$1,800.00 per user, per license year and shall remain in effect for a minimum of one year from license activation. Payment must be in the form of a check; payable to JAXPORT for the number of licenses needed by the Contractor and will be collected prior to the Notice-to-Proceed.

Additional licenses can be obtained at any time during the project for the same price and license term by contacting JAXPORT's Project Manager.

How to Submit Your Bid Response in Trimble Unity Construct (e-Builder)

Access the Bid Package

To access the bid package, ensure that you [registered with Trimble Unity Construct \(e-Builder\)](#). After registering, you will have a username and password that will allow you to login to the bidder portal and access the bid package.

If you do not see the bid package you are expecting, enter the invitation key from the bid invitation email into the field at the top of the page. The invitation key is case sensitive and specific to your email address (DO NOT SHARE).

To access the bid package

1. Click the link in the bid request email.
 - The Trimble Unity Construct Bid Portal login page is displayed.
2. Enter your username and password.
3. Click the name of the bid package you want to access.
 - The bid package details page is displayed.



To accept / decline the invitation to bid

1. Access the bid package to display the Invitation tab.
2. Click **Accept** or **Decline** the Invitation to update the **Bidding** field to either Will Bid or Will Not Bid.

Review Package Invitation

The Bid Package view contains key package information at the top of the screen.




- **Title:** Displays project/package name.
- **Status:** Displays Open or Closed and whether you have accepted, declined or have not response yet.
- **Timeframe:** Displays how much time is left before the bid due date / time.
- **Summary:** Displays the current financial total of your bid response.
- **Bid Info:** Displays Bid package description, contact person, pre-bid meeting details and bid instructions.
- **Invitation Documents:** Drawings, specifications and other documents for the bid are published on this tab.
- **Addenda:** If addenda are published, you will be required to acknowledge your receipt of every addendum with a check mark on the Additional Information tab. **If addenda are published after you have submitted a bid response, your bid will be set back to Draft status and you will need to resubmit your response.**

To download a file or folder, click  beside the file name. To download all the files and sub-folders in a folder, click  beside the folder name. A folder containing multiple sub-folders or files will be automatically downloaded as a .zip file. A confirmation message will be displayed if the download is successful.


Submit Your Bid Response

After reviewing the bid package invitation, use the Response Form tab to submit your bid response.

To submit your bid

1. Access the bid package.
2. Click the **Response Form** tab.
3. On the **Step 1: Bid Form** tab, enter your pricing on the bid form line items.
Ensure that you provide pricing at the level of detail required by the bid. Some line items may be lump sum, and others may require quantities and unit prices.
 - If there are areas that do not pertain to your trade, enter a zero (0) value in that line.
 - The Summary box at the top of the page maintains a running total of your entries for reference.
4. Click  (Save) and ensure that your work is saved periodically.
 - (Optional) To export the bid items to a spreadsheet that you can customize or that you can share with your team, click  (Download). After updating the spreadsheet, click  (Upload) to re-import it.
5. On the **STEP 2: Response Documents** tab, click **Attach Documents**, and upload any supporting document needed to support your bid. Any Bid Submission custom fields that have been setup for your account will also be displayed here. All uploaded documents will be displayed in a table at the bottom of the tab for you to review.
6. On the **STEP 3: Additional Required Info** tab, complete any additional questions or qualification statements that have been established by the bid manager. When available, the custom fields set up for your account will be displayed on this tab. If any addenda have been issued, you are required to acknowledge receipt of the addenda on this page before submitting your bid.
7. Review the entire Response Form and click **Submit**.
8. When prompted, enter your Trimble Unity Construct portal password and click **Submit Bid**.
The date and time that you submitted your bid is stamped on your Response Form. You will also receive an email confirmation.

Additional Notes

- **After the bid due date/time has passed, the Submit button will be disabled. It is critical that you complete the entire process prior to the cut-off time. The system will not permit you to submit your proposal or bid after the deadline regardless of where you are in the process. As stated, the Submit button is systematically disabled promptly at the deadline and JAXPORT is unable to see anything you have uploaded prior to the bid due date/time. No late submissions will be permitted or accepted. Please plan accordingly.**
- If the bid manager adds or changes a bid item, or publishes an addendum, your bid will be set back to a Draft status. You will receive an email notification and will be required to reconfirm your bid and resubmit.
- When you need to step away from entering the quote, click  (Save). It is recommended that you save every 15 minutes. This will ensure that your changes are saved.
- If there are areas that do not pertain to your trade, enter a zero (0) value in that line item.

- If you have your qualifications in Word® or another program, copy and paste them into the qualifications.
- It is required that you acknowledge all the addenda, even if they do not pertain to your trade.
- It is recommended that you submit your quote at least 60 minutes before the due time so that you can rectify any errors. To submit the proposal, you must complete all the fields and acknowledge the addenda items.
- **Failure to submit all information requested documents will result in a proposal or bid being considered “non-responsive,” and therefore will be rejected.**

Recall your Bid Response *(only if necessary)*

If you failed to submit all documents or see an error on a page **after submitting** your bid, you can make changes to your bid before the due date/time without any interaction from the bid manager. The bid manager has no record of your bid response until you click **Submit again**.

To recall your bid response

1. On the **Response Form** tab, click **Recall Bid**.
2. Optionally provide a reason for your recall and then click **Yes, I am sure**.
 - Your previous submission information is displayed on the Response Form tab.
3. Click **Submit** to resubmit your bid prior to the bid due date/time.

ARTICLE V

JAXPORT PROCUREMENT GOALS SMALL AND EMERGING BUSINESS (SBE) PARTICIPATION POLICY, GOALS, CONDITIONS AND INSTRUCTIONS

5.01 POLICY

It is the official policy of the Jacksonville Port Authority (JAXPORT) to require the inclusion of firms owned and controlled by Small and Emerging Business Enterprises in contract awards and projects whenever feasible.

The Authority has determined that the MANDATORY participation will be 100% SEB (JSEB/DBE/SBA/MBE/WBE) for this contract. This bid has been designated *only* for the competition of vendors in any of the categories listed below:

5.02 CERTIFICATION

Jacksonville Small and Emerging Business Enterprise (JSEB): JSEB vendors must be COJ certified and included in the Directory prior to the date of the bid opening or have a pending application that is resolved prior to award.

Disadvantaged Business Enterprise (DBE): DBE means a small business concern that is at least 51 percent owned by one or more socially and economically disadvantaged individuals and whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals that own the business. Firms desiring to participate as DBEs in this bid must be duly certified by the Florida Department of Transportation (FDOT) or a member of the Florida Unified Certification Program (FUCP) and listed in the FUCP DBE Directory of certified firms. JTA is the local certifying agency for the DBE Program.

Small Business Administration Certified Firms (SBA): Small Business companies as designated by the U.S Small Business Administration and listed in the Central Contractor Registration (CCR) on-line database. Firms must be active with assigned DUNS numbers.

Minority/Women Business Enterprise (MBE/WBE): A for-profit small business concern that performs a commercially useful function and is legitimately owned and controlled by minorities or women (as described by the Minority Business Development Agency of the Department of Commerce).

5.03 SEB Agencies

City of Jacksonville
Ed Ball Building
214 North Hogan Street, Suite 800
Jacksonville, Florida 32202
Phone: (904) 255-8840
Fax: (904) 255-8842
<http://cojapps.coj.net/jseb/>

Jacksonville Transportation Authority
Disadvantaged Business Enterprise Program
100 N. Myrtle Avenue
Jacksonville, Florida 32203
(904) 598-8728
www.jtafla.com

Florida Department of Transportation (FDOT)
Equal Opportunity Office
605 Suwannee Street MS-65
Tallahassee, Florida 32399
(850) 414-4747
<http://www.fdot.gov/equalopportunity/>

US Small Business Administration
North Florida District Office
7825 Baymeadows Way, Suite 100-B
Jacksonville, Florida 32256
(904)443-1930
http://web.sba.gov/pro-net/search/dsp_dsbs.cfm

Minority Business Development Agency
Miami District Office
51 Southwest, 1st Avenue
Miami, Florida 33130
(786) 315-0888
www.mbda.gov

5:04 SEB Certified Vendor Obligation

Bidders are required to submit a proof of current certification with the respective agencies at the time of bid opening. Vendors who do not meet this requirement will be considered non-responsive and ineligible for award. In addition, submission of a bid by a prospective bidder shall constitute full acceptance of all conditions outlined in this bid specification. Please note that in order to maintain the integrity of its SEB Program JAXPORT is requiring that the successful Bidder performs at least 40 percent (40%) of the total value of the work, failure to do so will constitute a breach of contract.

For further information concerning participation on this bid, please contact:

Michael L. McCoy, Coordinator
Vendor Management & SEB Programs
Jacksonville Port Authority
2831 Talleyrand Avenue
Jacksonville, Florida 32206
Office Number: (904) 357-3003
Fax Number: (904) 357-3077
Michael.McCoy@jaxport.com

JACKSONVILLE PORT AUTHORITY
"Schedule of Subcontractor / Subconsultant Participation"

Name of Bidder: _____

Project Title: _____

BID Number: _____

TOTAL BASED BID AMOUNT: _____

****Please list all SEB Vendors first**

NAME SUB FIRM	ADDRESS OF FIRM	TYPE SUB (SEB)	TYPE OF WORK TO BE PERFORMED	TOTAL CONTRACT VALUE & \$\$ PERCENTAGE
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

CONSULTANT/SUBCONTRACTOR/SUPPLIER TOTAL VALUES		
Hispanic, Asian-American Participation Total Values:	\$	% of contract
African-American Participation Total Value:	\$	% of contract
Native-American Participation Total Value:	\$	% of contract
Woman Participation Total Value:	\$	% of contract
Other Socially and Economically Disadvantaged Individual Including JSEB/MBE/WBE/DBE/SBA Vendors	\$	% of contract

The undersigned will enter into a formal Agreement with the JSEB/DBE Suppliers/Consultants/Subcontractors identified herein for work listed in this scheduled conditioned upon execution of a contract with JAXPORT. Under penalties of perjury I declare that I have read the foregoing conditions and instructions and the facts are true to the best of my knowledge and beliefs.

Signature: _____ Title: _____ Date: _____

Print Name: _____

Sworn to and subscribed before me, this _____ day of _____, 20____

NOTARY PUBLIC STATE OF: _____

MY COMMISSION EXPIRES: _____

PRINTED, TYPED OR STAMPED
COMMISSIONED NAME OF NOTARY PUBLIC

BIDDERS MINIMUM REQUIREMENTS

BIMT EQUIPMENT WASH FACILITY

DATE: _____

Name of Bidder: _____

Address: _____

The following information is required in connection with your bid under Contract No. **C-1965**.

1. Bidder is to furnish a complete set of your company's most recent audited financial statements. If no audited financial statements exist, provide firms most recent balance sheet, income statement, and statement of cash flows prepared internally, approved and attested to by your company president or chief executive officer. If the financial statements are more than 180 days old, the firm shall include evidence signed by an officer of the firm as to current financial condition in relation to the most recent reporting period.
2. Bidder is to furnish names and addresses of banks with which your firm maintains accounts, their telephone numbers and persons to contact.

3. Bidder is to list all of your current construction contracts.

Owner, Address, Phone #, Contact Name and Email	Work, Scope and Location	Contract Value	Prime Y/N	Percent Complete

BIDDERS MINIMUM REQUIREMENTS

BIMT EQUIPMENT WASH FACILITY

4. Are you prepared to accomplish the work in accordance with the project time frame specified on page SC-2 as 183 calendar days? _____ **(Yes/No)**
5. Bidder is to list names and addresses of principal trade creditors (principal is defined to mean banks, suppliers, vendors, etc.).

6. Bidder is to list a minimum of three (3) projects similar in nature to the scope of work of this project with a contract value no less than **\$250,000** over the past five (5) years, previously performed as the primary contractor, and date completed. The owners listed may be contacted for reference checks.

Owner, Address, Phone #, Contact Name and Email	Scope of Work	Date Started & Completed	Prime Y/N	Contract Value

BIDDERS MINIMUM REQUIREMENTS

BIMT EQUIPMENT WASH FACILITY

7. Bidder is to list gross receipts from construction contracts during last five (5) years.

Year	Gross Receipts From Construction Contracts	Average Annual Volume: \$
		Est. Annual Capacity: \$
	\$	Largest Job in 5 Years:
	\$	
	\$	
	\$	
	\$	Description:

8. Bidder is to list officials and key employees who will be engaged on work.

Name	Address	Position

9. In compliance with the General Conditions, Section II: Bidders must provide the names and resumes of the management team (Project Manager and Project Superintendent) proposed to be assigned to the work at all times during the project with full authority to act for you as required by the General Conditions.

Project Manager: _____

Project Superintendent: _____

BIDDERS MINIMUM REQUIREMENTS

BIMT EQUIPMENT WASH FACILITY

10. Bidder is to list major equipment to be employed on contract.

Equipment Type, Capacity and Manufacturer	Age	Condition	Location

11. Bidder is to provide the number of Trimble Unity Construct (E-Builder) licenses and duration needed for completion of the contract.

of licenses _____ Duration of licenses _____

12. By execution below your firm acknowledges that it has reviewed the agreement and shall execute the JAXPORT agreement form without exception or qualification.

Failure to furnish aforementioned information with the bid package may cause the bid to be non-responsive. Failure to assign the aforementioned management team to the project is a material breach of the contract that may result in termination of the contract in accordance with the General Conditions.

BIDDER (Company Name): _____

By (Signature): _____

Typed Name: _____

Title: _____

Date: _____

CONFLICT OF INTEREST CERTIFICATE

EXHIBIT B

JAXPORT Contract No.: C-1965

Bidder must execute either Section I or Sections II and III, hereunder, as required by Chapter 112 of the Florida Statutes. Failure to execute either Section I or Section II and Section III may result in the rejection of this bid/proposal.

SECTION I

I hereby certify that no public officer or employee of JAXPORT has a material financial interest or any business entity of which the officer, director or employee of the officer's, director's or employee's spouse or child is an officer, partner, director, or proprietor or in which such officer, director or employee or the official's, director's or employee's spouse or child, or any combination of them, has a material interest in this contract.

"Material Interest" means direct or indirect ownership of more than 10 percent of the total assets or capital stock of any business entity.

Signature

Company Name

Name of Official (type or print)

Business Address

City and State

Zip Code

CONFLICT OF INTEREST CERTIFICATE

EXHIBIT B

JAXPORT Contract No.: C-1965

SECTION II

I hereby certify that the following named public official(s) and/or JAXPORT employee(s) having material financial interest(s) (in excess of 10%) in this company have each filed Section III (Public Official Disclosure) with JAXPORT, Office of the Chief Executive Officer, 2831 Talleyrand Avenue, Jacksonville, Florida 32206-0005 prior to the time of bid opening.

Name	Title or Position	Date of PUBLIC OFFICIAL DISCLOSURE Filing

Signature

Company Name

Name of Official (type or print)

Business Address

City and State

Zip Code

CONFLICT OF INTEREST CERTIFICATE

EXHIBIT B

JAXPORT Contract No.: C-1965

SECTION III (Public Official Disclosure)

JAXPORT requires that a public official who has a financial interest in a bid or contract make a disclosure at the time that the bid or contract is submitted or at the time that the public official acquires a financial interest in the bid or contract. Please provide disclosure, if applicable, with bid.

Public Official Signature: _____

Public Official Name: _____

Public Position Held: _____

Position or Relationship with Bidder: _____

Date: _____

BID FORM
JAXPORT PROJECT NO.: B2023-04
JAXPORT CONTRACT NO.: C-1965
BIMT EQUIPMENT WASH FACILITY
BLOUNT ISLAND MARINE TERMINAL

BIDDER'S NAME: _____

The undersigned hereby proposes to furnish all materials, equipment, labor, and supervision for the above identified project, in accordance with the specifications and drawings for Contract No. **C-1965**, at the following price:

Scope of Work: Furnish all labor, material, equipment, supervision, incidentals, means and methods to construct a new covered equipment wash facility adjacent to the Crane Watch Building on its Blount Island Marine Terminal (BIMT) per the contract specifications and contract drawings.

BID FORM		
Bid Item	Description	Lump Sum
1. GENERAL	This category includes, but is not necessarily limited to:	Cost in US\$
G1	Mobilization & Demobilization	
G2	Environmental BMP/ Erosion & Sediment Control	
G3	Location & Quantity Survey	
G4	Payment & Performance Bond	
1. GENERAL TOTAL - (Categories G1-G4):		\$
2. DEMOLITION	This category includes, but is not necessarily limited to:	Cost in US\$
D1	Sawcut & demolish existing pavement for bldg slab	
D2	Excavation for installation of canopy footings	
2. DEMOLITION TOTAL - (Categories D1-D2):		\$
3. CIVIL	This category includes, but is not necessarily limited to:	Cost in US\$
C1	4" PVC Pipe (Sanitary) & concrete encasement	
C2	1.5" PVC Pipe (Potable Water)	
C3	Oil Water Separator	
C4	Hose Valve	
C5	6"x 6"x 1.5" Mechanical Joint Tee (to Existing)	
C6	1.5" X 1.5" PVC Elbow	
C7	Neenah R-4990-DA, Type A Grate	
C8	Manholes	
C9	2" Resilient Wedge Gate Valve	
3. CIVIL TOTAL - (Categories C1-C9):		\$

BID FORM
JAXPORT PROJECT NO.: B2023-04
JAXPORT CONTRACT NO.: C-1965
BIMT EQUIPMENT WASH FACILITY
BLOUNT ISLAND MARINE TERMINAL

BID FORM - (continue)		
4. ELECTRICAL	This category includes, but is not necessarily limited to:	Cost in US\$
E1	New 200A Breaker in HV39	
E2	Feeder to PP1	
E3	Panelboard, PP1, 200A, 480/277V, 3 PH 4 W	
E4	Transformer, 15KVA 480-208/120V	
E5	Panelboard, LP1, 100A, 240V/120V, 1 PH 3 W	
E6	Light, High Bay, Wet Location	
E7	Light, Exterior Wall Pack	
E8	Receptacles, Quad, 20A, 120V, Wet Location, GFCI Type	
E9	20"Wx24"L X 8" DEEP NEMA 4X ENCLOSURE SS	
E10	Switch, Wet Location, 120V, 20A	
E11	Disconnect Switch, 30A Wet Location NEMA 4X SS	
E12	Disconnect Switch, 200A, Wet Location NEMA 4X SS	
E13	Comm Handhole, 24"X24" Traffic Rated	
E14	Comm Conduit	
E15	Lightning Protection System	
4. ELECTRICAL TOTAL - (Categories E1-E15):		\$
5. STRUCTURAL	This category includes, but is not necessarily limited to:	Cost in US\$
P1	Structural Concrete (slab and foundation)	
P2	Pre-Engineered Metal Building System	
5. STRUCTURAL TOTAL - (Categories P1-P2):		\$
A. LUMP SUM BID PRICE - GRAND TOTAL (Bid Category Items 1-5):		\$
Notes (1) <input type="checkbox"/> Line Item "A." will serve as the Basis of Award (2) <input type="checkbox"/> Bid prices for the various work items are intended to establish a total price for completing the project in its entirety. The Contractor shall include in the Bid, any item for which a separate pay item has not been established in the Bid Form (under any related pay item), to reflect the total price for completing the project in its entirety. (3) <input type="checkbox"/> Bidder shall verify all quantities prior to bidding.		

(Submission of more than one bid form for the same work by an individual, firm, partnership or corporation under the same or different names and/or any alterations, exceptions or comments contained within the bid form shall be grounds for rejection of the bid)

Basis of Award: The Authority reserves the right to award this contract to the bidder whose prices is the lowest based on Total Lump Sum Bid Price – Grand Total (Line A, Bid Category Items 1 - 5), subject to availability of appropriated funds.

BID FORM
JAXPORT PROJECT NO.: B2023-04
JAXPORT CONTRACT NO.: C-1965
BIMT EQUIPMENT WASH FACILITY
BLOUNT ISLAND MARINE TERMINAL

JAXPORT reserves the right to award this contract to the lowest, responsive, responsible bidder, whose bid is fully conforming to the requirements of the bid documents. Nevertheless, JAXPORT reserves the right to waive informalities or minor irregularities in any bid, to reject any or all bids, and to accept the bid which, in its judgment, will be in the best interest of JAXPORT. JAXPORT will be the sole judge of which proposal will be in its best interest and its decision will be final.

JAXPORT reserves the right to award this contract to the bidder offering the lowest price consistent with meeting all specifications, terms, conditions, delivery requirements set forth on this bid. No award will be made until all necessary inquiries have been made into the responsibility of the lowest conforming bidder and JAXPORT is satisfied that the lowest bidder met all the requirements, is qualified and has the necessary organization, capital and resources required to perform the work under the terms and conditions of the contract. JAXPORT reserves the right to accept or reject any or all proposals, in whole or in part.

Bidder's Attestation:

Initials: _____ **Date:** _____ I hereby attest, as the Bidder's authorized agent, that Firm is not owned by the government of a foreign country of concern as defined below.

Under Florida Statutes, JAXPORT, like all state agencies and local government entities, is prohibited from entering into any contract or agreement with a foreign country of concern, which has been defined as "the People's Republic of China, the Russian Federation, the Islamic Republic of Iran, the Democratic People's Republic of Korea, the Republic of Cuba, the Venezuelan regime of Nicolás Maduro, or the Syrian Arab Republic, including any agency of or any other entity of significant control of such foreign country of concern."

The required bid guaranty is attached hereto (see "Supplemental Instructions to Bidders") of the contract documents.

Acknowledgment of the following addenda is hereby made (see "Supplemental Instructions to Bidders"):

Addendum No. 1, Dated: _____ Initials: _____

Addendum No. 2, Dated: _____ Initials: _____

Addendum No. 3, Dated: _____ Initials: _____

Addendum No. 4, Dated: _____ Initials: _____

See also "Bid Contents and Format" section of the "Supplemental Instructions to Bidders".

BID FORM
JAXPORT PROJECT NO.: B2023-04
JAXPORT CONTRACT NO.: C-1965
BIMT EQUIPMENT WASH FACILITY
BLOUNT ISLAND MARINE TERMINAL

Name of Contractor

AUTHENTICATION (see "Supplemental Instructions to Bidders")

Firm

Business Address

City

State

Zip Code

Mailing Address, if different from above

Authorized Signature

Date Executed

Typed Name

Title

Telephone Number

Facsimile Number

Company Federal Tax I.D. No.

Company's Business License No.

BID BOND FORM
JAXPORT PROJECT NO.: B2023-04
JAXPORT CONTRACT NO.: C-1965
BIMT EQUIPMENT WASH FACILITY
BLOUNT ISLAND MARINE TERMINAL

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned,
_____ as
Principal and _____ as
Surety, are hereby held and firmly bound unto JAXPORT, in the sum of
_____ dollars (\$_____) as liquidated damages for payment
of which, well and truly to be made, we hereby jointly and severally bind ourselves, our
heirs, executors, administrators, successors and assigns.

The Conditions of the above obligation are such that whereas the Principal has
submitted to JAXPORT, a certain Proposal attached hereto and hereby made part
hereof, to enter into a Contract Agreement in writing, for construction of
_____.

NOW THEREFORE,

- (a) If said Proposal shall be rejected or withdrawn as provided in the
Instructions to Bidders attached hereto or, in the alternative,
- (b) If said Proposal shall be accepted and the Principal shall sign and deliver a
formal contract document in the form of the Contract Agreement attached
hereto (properly completed in accordance with said Proposal) and shall
furnish the specified Bonds required by Section V of the Contract
Documents in the amount equal to one hundred percent (100%) of the
base bid within ten (10) consecutive days after the receipt of said
contract,

thence this obligation shall be void, otherwise, it shall remain in force and effect; it
being expressly understood and agreed that the liability of the Surety for any and all
claims hereunder in no event shall exceed the amount of this obligation as herein
stated.

The Surety, for value received, hereby stipulates and agrees that the obligations
of said Surety and its bond shall be in no way impaired or affected by an extension of

BID BOND FORM
JAXPORT PROJECT NO.: B2023-04
JAXPORT CONTRACT NO.: C-1965
BIMT EQUIPMENT WASH FACILITY
BLOUNT ISLAND MARINE TERMINAL

the time within which such Proposal may be accepted, and said Surety does hereby waive notice of any extension.

The sum herein stated shall be due and payable to JAXPORT, and the "Surety" herein agrees to pay said sum immediately upon demand of said JAXPORT in good and lawful money of United States of America; as liquidated damages for failure thereof of said "Principal".

IN WITNESS WHEREOF, the said _____,
by means of physical presence or online notarization and as "Principal" herein, has caused these presents to be signed in its name by its _____ and attested by its _____ under its corporate seal, and the said _____ as "Surety" herein, has caused these presents to be signed in its name by its _____ and attested by its _____ under its corporate seal, this _____ Day of _____ A.D., 20____.

AS PRINCIPAL (SEAL)

ATTEST:

Its _____

Its _____

**Signed, Sealed and Delivered
In the presence of:**

By _____
AS SURETY

ELECTRONIC DATA REQUIREMENTS TRIMBLE UNITY CONSTRUCT (E-BUILDER)

Exhibit

JAXPORT CONTRACT NO. C-1965

Contractor agrees to the following:

"The Trimble Unity Construct (E-Builder) system is for authorized users only. Unauthorized use of this system is strictly prohibited and may be subject to criminal prosecution. Use of this network constitutes consent to monitoring retrieval and disclosure of any information stored within the system for any purpose including criminal prosecution. Information contained within this system is confidential, intended for the licensed users and may contain information that is proprietary to the user, and/or privileged, confidential and/or otherwise exempt from disclosure under applicable state and federal law. Use by anyone other than the licensed users is not a waiver of any applicable privilege."

Signature

Company Name

Name of Official (type or print)

Business Address

City and State

Zip Code

SWORN STATEMENT PURSUANT TO SECTION 287.133(3)(A),

FLORIDA STATUTES, ON PUBLIC ENTITY CRIMES

THIS FORM MUST BE SIGNED AND SWORN TO IN THE PRESENCE OF A NOTARY PUBLIC OR OTHER OFFICIAL AUTHORIZED TO ADMINISTER OATHS.

1. This sworn statement is submitted to _____ **JAXPORT** _____

by _____

(print individual's name and title)

for _____

(print name of entity submitting sworn statement)

whose business address is _____

and (if applicable) its Federal Employer Identification Number (FEIN) is _____

(If the entity has no FEIN, include the Social Security Number of the individual signing

this sworn statement: _____.)

2. I understand that a "public entity crime" as defined in Paragraph 287.133(1)(g), **Florida Statutes**, means a violation of any state or federal law by a person with respect to and directly related to the transaction of business with any public entity or with an agency or political subdivision of any other state or of the United States, including, but not limited to, any bid or contract for goods or services to be provided to any public entity or an agency or political subdivision of any other state or of the United States and involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, or material misrepresentation.

3. I understand that "convicted" or "conviction" as defined in Paragraph 287.133(1)(b), **Florida Statutes**, means a finding of guilt or a conviction of a public entity crime, with or without an adjudication of guilt, in any federal or state trial court of record relating to charges brought by indictment or information after July 1, 1989, as a result of a jury verdict, nonjury trial, or entry of a plea of guilty or nolo contendere.

4. I understand that an "affiliate" as defined in Paragraph 287.133(1)(a), **Florida Statutes**, means:

1. A predecessor or successor of a person convicted of a public entity crime; or

2. An entity under the control of any natural person who is active in the management of the entity and who has been convicted of a public entity crime. The term "affiliate" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in the interest in another person, or a pooling of equipment or income among persons when not for fair market value under an arm's length agreement, shall be a prima facie case that one person controls another person. A person who knowingly enters into a joint venture with a person who has been convicted of a public entity crime in Florida during the preceding 36 months shall be considered an affiliate.

5. I understand that a "person" as defined in Paragraph 287.133(1)(e), **Florida Statutes**, means any natural person or entity organized under the laws of any state or of the United States with the legal power to enter into a binding contract and which bids or applies to bid on contracts for the provision of goods or services let by a public entity, or which otherwise transacts or applies to transact business with a public entity. The term "person" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in management of an entity.

**SWORN STATEMENT PURSUANT TO SECTION 287.133(3)(A),
FLORIDA STATUTES, ON PUBLIC ENTITY CRIMES**

6. Based on information and belief, the statement which I have marked below is true in relation to the entity submitting this sworn statement. **(Indicate which statement applies.)**

____Neither the entity submitting this sworn statement, nor any of its officers, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, nor any affiliate of the entity has been charged with and convicted of a public entity crime subsequent of July 1, 1989.

____The entity submitting this sworn statement, or one or more of its officers, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989.

____The entity submitting this sworn statement, or one or more of its officers, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989. However, there has been a subsequent proceeding before a Hearing Officer of the State of Florida, Division of Administrative Hearings and the Final Order entered by the Hearing Officer determined that it was not in the public interest to place the entity submitting this sworn statement on the convicted vendor list. **(Attach a copy of the final order)**

I UNDERSTAND THAT THE SUBMISSION OF THIS FORM TO THE CONTRACTING OFFICER FOR THE PUBLIC ENTITY IDENTIFIED IN PARAGRAPH 1 (ONE) ABOVE IS FOR THAT PUBLIC ENTITY ONLY AND, THAT THIS FORM IS VALID THROUGH DECEMBER 31 OF THE CALENDAR YEAR IN WHICH IT IS FILED. I ALSO UNDERSTAND THAT I AM REQUIRED TO INFORM THE PUBLIC ENTITY PRIOR TO ENTERING INTO A CONTRACT IN EXCESS OF THE THRESHOLD AMOUNT PROVIDED IN SECTION 287.017, FLORIDA STATUTES FOR CATEGORY TWO OF ANY CHANGE IN THE INFORMATION CONTAINED IN THIS FORM.

(signature)

(date)

STATE OF _____

COUNTY OF _____

NOTARY PUBLIC

My commission expires:

**CONTRACTOR CERTIFICATION REGARDING
SCRUTINIZED COMPANIES LISTS**

Respondent Contractor Name: _____
Contractor FEIN: _____
Contractor's Authorized Representative Name and Title: _____
Address: _____
City: _____ State: _____ Zip: _____
Phone Number: _____
Email Address: _____

Section 287.135 of the Florida Statutes prohibits agencies from contracting with a company on the Scrutinized Companies with Activities in Sudan List or on the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, lists created pursuant to section 215.473, Florida Statutes, for goods or services over \$1,000,000.

As the person authorized to sign on behalf of Respondent, I hereby certify that this company, listed above by "Respondent Contractor Name," complies fully with the law and is not listed on either the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List. I understand that pursuant to section 287.135, Florida Statutes, the submission of a false certification may subject the company to civil penalties, attorney's fees, and/or costs.

So Certified:
Authorized Representative's Signature _____
Date Signed: _____

ACKNOWLEDGEMENT AND ACCEPTANCE OF E-VERIFY COMPLIANCE

E-VERIFY PROGRAM FOR EMPLOYMENT VERIFICATION

In accordance with the Governor of Florida, Executive Order Number 11-02 (Verification of Employment Status), whereas, Federal law requires employers to employ only individuals eligible to work in the United States; and whereas, the Department of Homeland Security’s E-Verify system allows employers to quickly verify in an efficient and cost effective manner;

The Contractor agrees to utilize the U.S. Department of Homeland Security’s E-Verify system to verify the employment eligibility of all new employees hired by the Contractor during the term of the contract. Contractors must include in all subcontracts the requirement that all subcontractors performing work or providing goods and services utilize the E-Verify system to verify the employment eligibility of all new employees hired by the subcontractor during the contract term. The Contractor further agrees to maintain records of its participation and compliance and its subcontractor’s participation and compliance with the provisions of the E-Verify program, and to make such records available to JAXPORT upon request. Failure to comply with this requirement will be considered a material breach of the contract.

By signing below, I acknowledge that I have reviewed, accept and will comply with the regulations pertaining to the E-Verify program.

Company Name Name of Official (Please Print)

Signature of Principal Title: Date



CONTRACT RELATED DOCUMENTS

FOR

BIMT EQUIPMENT WASH FACILITY

Project No.: B2023-04

Contract No.: C-1965

BLOUNT ISLAND MARINE TERMINAL

CONTRACT RELATED DOCUMENTS

INDEX

ITEM	PAGE NO(S).
GENERAL CONDITIONS	GC-1 TO GC-43
SPECIAL CONDITIONS	SC-1 TO SC-8
REQUIRED LIMITS OF INSURANCE	RLI-1 TO RLI-3
CERTIFICATE OF INSURANCE COMPLIANCE	COIC-1 TO COIC-3
APPLICATION FOR PAYMENT	AFP-1 & AFP-2
CONTRACTOR'S REQUEST FOR CLARIFICATION	CRC
REQUEST FOR INFORMATION	RFI
AGREEMENT BETWEEN OWNER AND CONTRACTOR	AGR-1 TO AGR-4
CERTIFICATE OF CONTRACT COMPLETION	FCC
CERTIFICATE OF SUBSTANTIAL COMPLETION	SUBCOM
CONSENT OF SURETY COMPANY TO FINAL PAYMENT	CONSUR
OWNER'S MINIMUM PROJECT WORK RULES	PWR-1 TO PWR-2
OWNER'S SAFETY GUIDELINES	PSG-1 TO PSG-3
PERFORMANCE BOND	PB-1 TO PB-4
STATUTORY PAYMENT BOND	SPB-1 TO SPB-3

GENERAL CONDITIONS

INDEX

ITEM	PAGE NO.
	GC-
SECTION I.: Preliminary Matters	2
1. Definitions.....	2
2. Contract Documents.....	3
3. Subcontracting or Assigning of Contract.....	4
4. Separate Contracts.....	5
5. Non-discrimination Provisions.....	5
6. Wage and Employment Laws	5
7. Royalties and Patents.....	6
8. Right to Audit.....	6
SECTION II.: The Work	7
1. Contractor's Responsibility.	7
2. Execution of the Work	11
3. Substantial Completion	16
4. Tests and Inspections.....	17
5. Time.....	18
6. Warranties and Guarantees.....	18
SECTION III.: Changes and Disputes	19
1. Changed Conditions.	19
2. Changes in the Work.....	19
3. Claims.....	22
4. Completion of Work by Owner	23
5. Default and Termination	24
6. Delays and Extensions of Time.....	26
7. Disputes.....	27
8. Recovery Rights, Subsequent to Final Payment.....	27
SECTION IV.: Administrative.....	29
1. "As-built" Drawings and Equipment Manuals	29
2. Conferences	29
3. Payments.....	30
4. Progress Schedule.....	32
SECTION V.: Insurance and Bond	34
1. Insurance and Indemnification.	34
2. Surety Bonds.....	42

GENERAL CONDITIONS

SECTION I.: PRELIMINARY MATTERS

1. Definitions

- a. Owner: The Owner is JAXPORT or its designee authorized in writing. The words "Owner", "JAXPORT", "JPA" and "Authority" shall mean the same and are used interchangeably.

Owner Representative/Project Manager: The Owner will designate an individual or firm to be Project Manager for all work to be accomplished under the contract. All instructions and correspondence to the Contractor will be issued by the Project Manager and all requests, invoicing, and correspondence from the Contractor will be directed to the Project Manager. The Project Manager will interpret the terms and conditions of the contract and be the judge of the performance of the Contractor on behalf of the Owner.

All correspondence relating to the contract shall be addressed to:

James "Tripper" Jones
JAXPORT
ENGINEERING SERVICES
POST OFFICE BOX 3005
JACKSONVILLE, FL 32206-0005

- b. Inspector: The Project Manager may appoint such Inspectors as he desires. They shall be authorized to inspect all work done, and materials furnished. They shall be authorized to call to the attention of Contractor personnel any failure of the Work or materials to conform to the specifications and contract. They shall have the authority to reject nonconforming materials and workman-ship, and construction methods or procedures which produce substandard results and to take appropriate action to avoid any dangerous or unsafe conditions. The presence of the Inspector shall in no way relieve the responsibility of the Contractor to comply with and perform all of the obligations specified in the contract documents. The Inspectors shall not be authorized to approve, direct, or establish any methods or procedures used by the Contractor in constructing the project. The Inspector is not authorized to approve any deviation from the contract documents nor any substitutions of materials or equipment.
- c. Approval: Where utilized in this contract, "approval" shall constitute a review by the Owner only to satisfy itself as to the general conformance of the subject as to the intent of the contract. Approval by the Owner does not indicate any responsibility of the Owner towards the design, materials, substitutions, dimensions, fit, function, strength, finish or any other quantity, capacity, or quality of the subject at hand. Approval by the Owner shall not relieve the Contractor from its responsibility for full compliance with the contract requirements, at his sole expense.

SECTION I.: PRELIMINARY MATTERS (... Continued)

- d. **Work:** Where used in these contract documents, the word "Work" shall include all actions, materials, tools, equipment and all appliances, machinery, appurtenances and engineering (when specified), and labor necessary to perform and complete the contract, and such additional items not specifically indicated or described which can be reasonably inferred as belonging to the scope and intent of the contract. The terms "Work" and "Project" shall mean the same and may be used interchangeably.
- e. **Consultant:** Where utilized by the Owner, the consulting firm or firms engaged by the Owner to provide professional services in conjunction with the planning, design, and construction of the Project will interpret the technical specifications and drawings, and will render judgments and decisions on matters of a technical nature as pertains to design and construction of the Project. The terms "Architect," "Architect/Engineer," "A/E," and "Engineer" shall all be construed to refer to the Consultant(s).
- f. **Contractor:** The individual, firm, company or corporation contracting with JAXPORT for performance of Work and/or furnishing of materials for construction of the Project is defined in the contract documents.
- g. **Certificate of Substantial Completion:** A written document representing a mutually agreed upon status of the progress of the Work as described in the contract documents, or a specified part thereof, between the Owner, the Contractor, and the Consultant whereby the Work is sufficiently complete and can be utilized for its intended purpose/ occupancy by the Owner without unreasonable inconvenience. The Owner reserves the right to make the final decision as to the status of the Work in reference to this definition.

2. Contract Documents

- a. **General:** The contract documents shall consist of the bidding documents, contract forms, conditions of the General Conditions, specifications, drawings, all addenda issued prior to the execution of the Agreement, the approved Project construction schedule(s), all amendments, change orders, and Engineer's response to Contractor's "Request for Information (RFI)" of the contract documents relating to construction issued by the Owner's representative. These form the contract, and what is required by any one shall be binding as if required by all. The intention of the contract documents is to include all labor, materials, equipment and other items necessary for the proper execution and completion of the Work so as to result in a fully operational and functional product. Any work, labor, equipment and materials that may reasonably be inferred from the specifications or drawings as being required to produce the intended result shall be supplied whether or not it is specifically called for in the contract documents. The contract Agreement shall be signed in duplicate by the Owner and the Contractor, unless otherwise stated.
- b. **Governing Law:** The terms and conditions of this contract will be governed by the laws of the State of Florida, and venue for any action shall be in Jacksonville, Florida.

SECTION I.: PRELIMINARY MATTERS (... Continued)

- c. Conflicts and Discrepancies: The Contractor shall take no advantage of any error or omission which he might discover in the plans or specifications but shall, within 5 working days, notify the Owner of such discovery, who will then make such corrections and interpretations as it deems necessary for reflecting the actual spirit and intent of the plans and specifications. Failure to make notice within 5 days to Owner by the Contractor will result in work performed at Contractor's own risk and Owner will have no liability for any claim resulting therefore.

The Owner, after receipt of written notice by the Contractor in resolving conflicts, errors, and discrepancies between the various contract documents generally, will give precedence in the following order:

- Approved Change Orders
- Addenda issued prior to receipt of bids
- The executed Agreement Form
- Owner's response to Contractor's Request for Information (Form RFI)
- Supplemental Instructions to Bidders
- Special Conditions of the specifications
- General Conditions of the specifications
- Technical specifications
- Drawings
- Other documents as listed on the Agreement between Owner and Contractor, Form FA
- Bid

Figure dimensions on drawings shall govern over scale dimensions, and detailed drawings shall govern over general drawings.

3. Subcontracting or Assigning of Contract

- a. The Contractor shall not subcontract more than 25 percent of the total value of jobsite Work, exclusive of the cost of all installed materials and equipment, without the prior written approval of the Owner. Qualifications of subcontractors may be required in the same manner as provided for the Contractor elsewhere in this contract (see "Instructions to Bidders").
- b. The Contractor agrees that it shall not subcontract, assign, delegate, or otherwise dispose of the contract, the duties to be performed under the contract, or the monies to become due under the contract without the Owner's prior written consent.
- c. Contracts between the Contractor and subcontractors or suppliers shall be in accordance with the terms of this agreement as applicable.
- d. Subcontracted work volume may reflect the JSEB Participation goals described in the "Instructions to Bidders".

SECTION I.: PRELIMINARY MATTERS (... Continued)

4. Separate Contracts

The Owner reserves the right to let other contractors perform work without conflict on the same or adjacent property. The Contractor shall cooperate and coordinate with any such other contractor(s).

5. Non-discrimination Provisions

The Contractor, upon execution of the Project agreement, certifies that it meets and agrees to the following provisions:

- a. The Contractor agrees that it will not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, marital status or disability nor will it discriminate in hiring nor fail to make reasonable accommodation for qualified handicapped employees.
- b. The Contractor agrees to comply with all applicable federal, state and local laws, including the Civil Rights Act 1964, as amended. The Equal Employment Opportunity Clause in Section 202, Paragraphs 1 through 7 of Executive Order 11246, as amended, relative to Equal Employment and the implementing rules and regulations of the Office of Federal Contract Compliance Programs are incorporated herein by specific reference. The Affirmative Action Clause in Section 503 of the Rehabilitation Act of 1973, as amended, relative to Equal Opportunity for the Disabled is incorporated herein by specific reference. The Affirmative Action Clause in 38 U.S.C. Section 2-12 of the Vietnam Veterans' Readjustment Assistance Act of 1974, relative to Equal Employment Opportunity for the special disabled veteran and veterans of the Vietnam era, is incorporated herein by specific reference.
- c. An entity or affiliate who has been placed on the State of Florida's discriminatory vendor list may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity, and may not transact business with any public entity.

To view a current list, visit:
http://dms.myflorida.com/business_operations/state_purchasing/vendor_information/convicted_suspended_discriminatory_complaints_vendor_lists
- d. The Contractor agrees that if any of the obligations of this contract are to be performed by a subcontractor, the provisions of this Section I.5 shall be incorporated into and become a part of the subcontract.

6. Wage and Employment Laws

- a. The Contractor shall observe and comply with Federal, State, and local laws

SECTION I.: PRELIMINARY MATTERS (... Continued)

relating to wages, rates of pay, and employment requirements, including applicable E.E.O. and Affirmative Action requirements.

- b. ARTICLE 1, SECTION 6, OF THE CONSTITUTION OF THE STATE OF FLORIDA RECOGNIZES THAT THE RIGHTS OF PERSONS TO WORK SHALL NOT BE DENIED ON ACCOUNT OF THE MEMBERSHIP OR NON-MEMBERSHIP IN ANY LABOR UNION OR LABOR ORGANIZATION.

7. Royalties and Patents

The Contractor shall pay all royalties and license fees. The Contractor shall defend all suits or claims for infringement of any patent rights and shall save the Owner harmless from loss on account thereof.

8. Right to Audit

The Contractor agrees to provide JAXPORT or any of their authorized representative's access to any books, documents, papers and records of the Contractor which are directly pertinent to this contract for the purposes of making audits, examinations, excerpts and transcriptions. JAXPORT will also be afforded access to all of the Contractor's records, including but not limited to payroll records, training books, correspondence, instructions, drawings, receipts, vouchers, memoranda and similar data relating to this Contract, and the Contractor will preserve all such records for (3) three years, or for such longer periods as may be required by law, after final payment.

The Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.

The Contractor shall pay all royalties and license fees. The Contractor shall defend all suits or claims for infringement of any patent rights and shall save the Owner harmless from loss on account thereof.

GENERAL CONDITIONS

SECTION II.: THE WORK

1. Contractor's Responsibility.

- a. Until substantial completion or final acceptance of the Work (whichever comes first) by the Owner, the Work shall be under the complete care, custody, and control of the Contractor. The Contractor shall assume all risks of loss during its period of custody.
- b. The Contractor shall supervise and direct the Work using its best skill, judgment, and attention. The Contractor shall be solely responsible for all construction means, methods, techniques, sequences and procedures, including implementation of the Contractor's Quality Control Program, the prudent exercise of all reasonable safety precautions, and for coordinating all portions of the Work under the contract to affect a timely completion, and resolving any delay or damages between itself and any other Contractor without involvement of the Owner.
- c. Unless otherwise specifically noted, the Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the Work.
- d. The Superintendent shall maintain one complete set of the contract documents including approved shop drawings on the jobsite at all times that Work is underway.
- e. The Contractor warrants to the Owner that all materials and equipment incorporated in the Work will be new unless otherwise specified, and that all Work will be of good quality, free from faults and defects, and in conformance with the contract documents. All Work not so conforming to these standards may be considered defective. In the event Work is rejected by the Project Manager, the Contractor shall correct, remove, and/or reconstruct such Work to conform to contract requirements at his sole expense including any testing or engineering costs necessitated thereby.
- f. The Contractor shall pay all sales, consumer use, and other similar taxes required by laws and secure all permits, fees, and licenses necessary for the execution of the Work.
- g. The Contractor shall promptly give all notices and comply with all laws, ordinances, permits, rules and regulations, order, and any public authority bearing on the performance of the Work, and shall notify the Owner if the drawings and specifications are at variance therewith, failure to do so shall result in Contractor's responsibility for any losses or damages associated with the work.
- h. The Contractor shall be responsible for the acts and omissions of all its employees, all subcontractors, suppliers, agents and employees and all other

SECTION II.: THE WORK (... Continued)

persons performing any of the Work under a contract with, or under the supervision of the Contractor.

- i. Contractor is required to record daily, the progress of the project and submit electronically in Trimble Unity Construct (E-Builder); daily progress reports to the OWNER including information on the subcontractor's work, and the percentage of completion.
- j. Contractor is required to and hereby agrees that it will exert every reasonable and diligent effort to assure that all labor employed by the Contractor and its sub-contractors for Work on the Project shall work in harmony with and be compatible with all other labor being used by building and construction contractors now or hereafter on the site of work covered by this contract.
- k. Contractor further agrees that this requirement will be included in all subcontracts of the subcontractor as well as in the Contractor's own contract provided, however, that this provision shall not be interpreted or enforced so as to deny or abridge on account of membership or non-membership in any labor union or labor organization, the right of any person to work as guaranteed by Article I, Section 6 of the Florida Constitution.
- l. Submittal Procedures.

Contractor shall submit each shop drawing Submittal for review electronically in Trimble Unit Construct (E-Builder).

Preliminary Shop Drawing Data: Within 20 days after the Award of the Contract the Contractor shall submit to the Project Manager a complete listing of manufacturers for all items for which shop drawings are to be submitted.

Shop Drawing Submittal Schedule: Within 30 days after the Notice to Proceed, the Contractor shall submit to the Project Manager a complete schedule of shop drawing submittals fixing the respective dates for submission, the beginning of manufacture, testing, and installation of materials, supplies and equipment, noting those submittals critical to the progress schedule.

Submittal Log: Contractor shall provide an accurate updated log of submittals maintained by the Contractor and subject to review by JAXPORT at each scheduled progress meeting.

When reviewed by JAXPORT each of the shop drawings will be identified as having received such review, being so labeled and dated. Shop drawings labeled "REJECTED" will be returned to the Contractor for correction and re-submittal with the required correction indicated on the shop drawing or listed on a "Shop Drawing Review sheet".

If submitted drawings or schedules show a departure or variation from the Contract Requirements which are in the interest of JAXPORT and to be so

SECTION II.: THE WORK (... Continued)

minor as not to involve a change in Contract Price or time for performance, JAXPORT may return the reviewed drawings without noting an exception.

Re-submittals will be handled in the same manner as first submittals. On re-submittals, the Contractor shall direct specific attention on the transmittal and on re-submitted shop drawings to revisions other than the corrections requested by the Project Manager on previous submissions. The Contractor shall make any corrections required by the Project Manager.

The Project Manager and JAXPORT'S Engineer of Record will review a Submittal/re-submittal a maximum of two (2) times after which the cost of review will be borne by the Contractor at JAXPORT'S Project Manager and Engineer of Record's standard hourly rate. No partial submittals will be reviewed. Submittals not complete will be returned to the Contractor, and will be considered "Rejected" until properly resubmitted.

Contractor shall submit a minimum of six (6) sets, plus additional sets as required by his Subcontractors, of each shop drawing Submittal for review.

If catalog sheets or prints of manufacturers' standard drawings are submitted as Shop Drawings, any additional information or changes on such drawings shall be typewritten or lettered in ink.

The minimum size for shop drawings shall be 11" X 17". Each shop drawing shall be clear, thoroughly detailed and shall have listed on it all Contract Documents references, drawing number(s), specification section number(s) and the shop drawing numbers of related work. Shop drawings must be complete in every detail, including location of the Work. Materials, gauges, methods of fastening and spacing of fastenings, connections with other work, cutting, fitting, drilling and any and all other necessary information per standard trade practices or as required for any specific purpose shall be shown.

Where professional calculations and/or certification of performance criteria of materials, systems, and or equipment are required, the Project Manager is entitled to rely upon the accuracy and completeness of such calculations and certifications submitted by the Contractor. Calculations, when required, shall be submitted in a neat clear and easy format to follow.

Contractor shall keep one set of Shop Drawings marked with Project Manager's and/or Engineer of Record's approval at the job site at all times.

- m. Shop Drawings and Samples.
- (1) The Contractor shall furnish all samples and shop drawings as required for approval by the Owner. Details, number of copies required, and format will be mutually agreed upon at the Preconstruction Conference.
 - (2) Approval of shop drawings, samples, materials, substitutions, or

SECTION II.: THE WORK (... Continued)

equipment deviating in any dimension, fit, strength, finish, capacity, or other quality shall not relieve the Contractor from full compliance with the contract requirements, at its sole expense, unless such exceptions, deviations, dimensions, substitutions, etc. are specifically identified and marked for attention on the shop drawing submittals and signed by the Contractor at time of submission. Approval of such specifically marked shop drawings shall permit the altered or substituted Work provided that any change in the contract price occasioned thereby is accomplished per Section III, "General Conditions". The Contractor shall bear full responsibility for coordinating proposed deviations, substitutions, dimensional changes and the like with all other affected trades, and for the full cost of any other subsequent modifications or changes to the Work necessitated thereby.

- (3) The Contractor and if applicable, the Subcontractor(s) shall thoroughly check, coordinate, stamp, sign and approve all shop drawings prior to submittal to the Owner for review. If it appears to the Project Manager that such review, coordination, and approval has not been done or is not adequate, the shop drawings will be returned to the Contractor without action. The Contractor shall bear the sole responsibility for performance of Work or ordering requiring shop drawing approval, in advance of such approval.
 - (4) THE CONTRACTOR SHALL BEAR THE SOLE RESPONSIBILITY FOR ANY DELAYS TO THE WORK OCCASIONED BY OR RESULTING FROM ITSELF OR ITS AGENTS, SUBCONTRACTORS, SUPPLIERS, OR EMPLOYEES' DELAY OR FAILURE TO FURNISH COMPLETE, CORRECT, COORDINATED SHOP DRAWINGS IN A TIMELY MANNER. DELAYS INCURRED DUE TO REJECTION OF INCOMPLETE AND/OR NON-CONFORMING SHOP DRAWINGS SHALL BE SOLELY THE RESPONSIBILITY OF THE CONTRACTOR, AND NO ADDITIONAL CONTRACT COST OR TIME SHALL BE ALLOWED ON ACCOUNT OF SUCH DELAYS.
- n. The Owner will furnish such information as is available at the time of contract award as to control points, benchmarks, recent surveys, or soundings concerning the worksite, and adjacent facilities, utilities, or structures. The Contractor, not the Owner, shall be responsible for any and all verifications required, extensions of survey control for the Work, ancillary surveying, location of centerlines, baselines, additional benchmarks, and any other measurements necessary for construction or design purposes, as appropriate.

Any markers or stakes set by the Owner or its representatives for control, inspection, or reference purposes during construction shall be preserved and left intact and undisturbed by the Contractor, unless in the way of construction. Prior to removal or relocation of any such marker by the Contractor, when necessary, the Contractor shall so inform the Owner's representative at the jobsite. Any such markers negligently destroyed or disturbed by the Contractor shall be restored at his expense.

SECTION II.: THE WORK (... Continued)

2. Execution of the Work.

- a. General. The Contractor shall preserve and protect from damage all property along the line of work, or which is in the vicinity of, or is in any way affected by the Work, the removal or destruction of which is not called for by the plans. This applies, but is not necessarily limited to public and private property, public and private utilities, trees, shrubs, signs, monuments, fences, guardrails, pipe and underground structures, wharves, railroads, bridges, roadways (except natural wear and tear resulting from legitimate use thereof by the Contractor etc.), and whenever such property is damaged due to the activities of the Contractor, it shall be immediately restored to a condition similar or equal to that existing before such damage or injury was done by the Contractor, and at his own expense, or he shall make good such damage or injury in a manner acceptable to the Owner. In case of failure on the part of the Contractor to restore such property or to make good such damage or injury, the Owner may upon 48 hours' notice proceed to repair, rebuild or otherwise restore such property as may be deemed necessary, and the cost thereof will be deducted from any monies due or which may become due the Contractor under the contract.
- b. Superintendence. The Contractor shall provide a qualified Superintendent on the Work throughout its progress, and shall specifically require that the Superintendent be present on the site at all times when any Work is being performed by itself or any of its subcontractors. Qualified Superintendent shall have a minimum of 10 years of construction experience, five of which are on similar projects in that capacity. All communications given to the Superintendent shall be as binding as if given to the Contractor. Once assigned, the Contractor's Superintendent shall not be replaced without prior written notice to the Owner. The Owner reserves the right to reject the assignment or reassignment of the Contractor's Superintendent. The Superintendent shall have full authority to execute the orders or directions of the Project Manager and to obtain or supply promptly any materials, tools, equipment, labor, and incidentals which may be required. The Contractor must provide on-site supervision at all times when work is being done. If, in the event that it is absolutely necessary for the Superintendent to be absent from the site, the Contractor shall notify the Project Manager, in writing, the assignment of the person on-site who will act in its place and be responsible for the project. This person must be an employee of the Contractor. Such superintendence shall be furnished regardless of the amount of Work sublet.
- c. Design Engineering. Where design engineering is the responsibility of the Contractor, the Contractor must assure that the engineer who certifies the design is appropriately authorized to do so according to the regulations and laws of the local community and the State of Florida.
- d. The Contractor shall have a responsible person available reasonably near the worksite and "on-call" on a 24-hour basis, 7 days a week; in order that it may be contacted in emergencies and in cases where immediate action must

SECTION II.: THE WORK (... Continued)

be taken to maintain traffic or to handle any other problem that might arise. The designated individual shall have full authority to take actions necessary to resolve such situations as previously described. For compliance with this requirement the furnishing of a local telephone number (non-toll) where such person can be directly reached will suffice.

- e. Except in the interest of safety or protection of persons, or the Work, or property at the site or adjacent thereto, and except as may otherwise be indicated in the "Special Conditions", all Work at the site shall be performed during regular working hours, and Contractor shall not permit overtime Work or the performance of Work on Saturday, Sunday, or any legal holiday without Owner's consent given after prior written notice to Owner's Project Manager. In general, all Work shall be performed during daylight hours. For special operations, night Work may be done if so authorized in writing. No night Work shall be performed unless adequate artificial lighting has been provided and has been approved by the Inspector.
- f. The Contractor shall not begin new items of Work to the prejudice of Work already started. The Owner may require the Contractor to finish a section or area on which Work is in progress before Work is started on an unrelated or additional section or area, unless the Contractor can clearly demonstrate to the Project Manager on a sound, rational, and convincing basis that its intended action is in the best interest of the Project.
- g. The Contractor shall at all times conduct the Work in such a manner and in such sequence as to insure the least practicable interference with traffic. The Contractor's vehicles and other equipment shall be operated in such a manner that they will not be a hazard or hindrance to the public. Materials stored on the worksite shall be placed so as to cause as little obstruction as possible.
- h. The Contractor shall arrange his work and dispose of his materials so as not to interfere with the operations of other contractors engaged upon adjacent work, and to join his work to that of others in a proper manner in accordance with the spirit of the plans and specifications, and to perform his work in the proper sequence in relation to that of other contractors, all as may be directed by the Owner. Each contractor will be held responsible directly to the Owner or any other contractor for any damage done by him, his agents, or his subcontractors to the work performed by another contractor. The Owner shall not be liable for damages caused between contractors.
- i. The Contractor shall so conduct his operations and maintain the Work in such condition that adequate drainage will be in effect at all times. Existing functioning storm sewers, gutters, ditches, and other run-off facilities shall not be unnecessarily obstructed.
- j. Heavy equipment shall not be operated close enough to new or previously existing structures to cause damage, disturbance or displacement.
- k. The Contractor shall provide qualified and acceptable personnel to organize,

SECTION II.: THE WORK (... Continued)

schedule, manage, layout, and construct the Work as required by the contract documents and shall assure that all Project executives, superintendents, and foremen employed by it on this Project are competent, knowledgeable in the Work, conscientious, attentive to the Project, and reliable. All workers must have sufficient skills and experience to properly perform the work assigned them. Welder qualification records will be furnished by the Contractor at no cost to the Owner. All workers engaged on specialty work or detailed (highly skilled) work, or in any recognized trade shall have had sufficient experience in such work to perform it properly and satisfactorily and to operate the equipment involved, and shall make due and proper effort to execute the Work in the manner prescribed in the specifications, or the Owner may take appropriate action as prescribed below.

- l. The Contractor shall at all times maintain good discipline and order at the site. Whenever the Project Manager has determined that any person employed by the Contractor is incompetent, unfaithful, malevolent, intemperate, disorderly or insubordinate, such person shall, upon notice to the Contractor's Superintendent, be promptly removed from the Work and shall not again be employed on it except with the written consent of the Project Manager. Should the Contractor upon due notice fail to remove such person or persons, the Owner may withhold all monies which are or may become due to the Contractor, or may suspend the Work until such orders to remove said person or persons have been accomplished as set forth in Article 8(i). The Contractor shall protect, defend, indemnify and hold the Owner, its agents, officials, and employees harmless from any and all claims, actions or suits arising from such removal, discharge, or suspension of unsuitable employees of the Contractor.
- m. The Contractor shall at all times keep the premises free from accumulation of waste materials and rubbish caused by the Work, and at the completion of the Work shall remove all rubbish, waste, salvage and surplus materials which resulted from the Work. The Contractor shall also remove all tools, construction equipment and machinery and shall leave the Project "broom clean", unless otherwise specified. All surplus and salvage material shall become the property of the Contractor unless otherwise specified in the contract documents.
- n. The Owner shall have the authority to suspend the Work wholly, or in part, for such period or periods as may be deemed necessary due to unsuitable weather or other conditions which are considered unfavorable for the prosecution of the Work; to accommodate actions, or for such time as is necessary due to the failure on the part of the Contractor to carry out orders given, or to comply with any or all provisions of the contract. Such suspension shall be ordered in writing by the Project Manager giving the Contractor, in detail, the reasons for the suspension and under what circumstances or conditions the Work may be permitted to resume.

Whenever the Work is suspended by the Owner for reasons other than the

SECTION II.: THE WORK (... Continued)

fault of the Contractor, an extension of time for completion of the Work due to such suspension may be made as allowed for in other sections of this contract.

Time extension shall be the Contractor's sole remedy unless otherwise agreed upon in writing prior to the commencement of work.

- o. The Contractor shall not suspend operations or remove equipment or materials necessary for the completion of the Work without the prior permission of the Owner.
- p. Cooperation with Port Operations.
 - (1) The Contractor understands that the Work will be performed on, or in the near vicinity of an operating marine terminal. The Contractor acknowledges that ship schedules and terminal operations take precedence over the Contractor's activities. Contractor shall provide upon request, manpower and equipment loading schedule for the project.
 - (2) The Owner will, insofar as possible, schedule berthing of ships, and general terminal operations, so as not to interfere with the Work of the Contractor. The Owner will review the schedule presented by the Contractor at the Preconstruction Conference and advise the Contractor of any known conflicts that may exist with terminal operations. The Contractor shall adjust its schedule to avoid those conflicts and ensure that its activities will not interfere or cause interference with terminal operations, at no cost to the Owner.
 - (3) Considering that ship schedules are not precise due to weather and delays at other ports, the Contractor will be notified a minimum of 24 hours prior to the expected arrival of a ship that will be berthed in, or affect the area of the Contractor's Work. The Contractor may be required to curtail its activities in the area affected to the satisfaction of the Project Manager until the construction site is available again at no cost to the Owner.
 - (4) The Contractor's Superintendent, however, during the course of the Work, shall contact the Terminal Director designee by telephone or personal contact, twice each day (early morning and late afternoon) concerning ship traffic schedules and cargo handling activities so as to minimize Contractor's "downtime" and improve his scheduling efforts.
 - (5) When the Work is stopped by the Authority for its convenience, or vessels are berthed in locations so as to impede the Contractor's Work, the total number of calendar days of delay shall be added to the time allowed for the completion of the Project which shall be the sole remedy available to the Contractor.
 - (6) When it is necessary that a change or interruption be made in terminal operations in order to carry out a construction operation, the Contractor shall submit a request electronically in Trimble Unity

SECTION II.: THE WORK (... Continued)

Construct (E-Builder) with full details including a pre-approved schedule at least 72 hours prior to the time the change or interruption is required. The Owner shall make all reasonable efforts to comply with the request of the Contractor. The Contractor shall not proceed with such Work until it has received written notice from the Owner to so proceed.

- q. Failure of Contractor to Maintain Satisfactory Progress.
- (1) Time is of the essence in this contract, and as delay in the prosecution of the Work will adversely impact the Owner's business, it is important that the Work be prosecuted to completion. Moreover, the cost to the Owner for the administration of the contract, including engineering, inspection, and supervision, will be increased as the construction period is lengthened.
 - (2) The Contractor may be declared delinquent because of unsatisfactory progress under this contract when the contract time allowed has not been entirely consumed, but the Contractor's progress at any check period does not meet at least one of the following two tests:
 - (a) The percentage of dollar value of completed Work with respect to the total amount of the contract is within 15 percentage points of the percentage of contract time elapsed.
 - (b) The percentage of dollar value of completed Work is within 15 percentage points of the dollar value which should have been performed according to the Contractor's own progress schedule previously approved by the Owner.
 - (3) The Contractor will be declared delinquent because of unsatisfactory progress under this contract should either of the following circumstances occur:
 - (a) The contract time allowed has been consumed and the Work has not been completed.
 - (b) The contract time allowed has not been entirely consumed, but the Contractor's progress at any check period does not meet either of the two tests described under Sub-article (2) above.
 - (4) A Contractor determined delinquent will be disqualified from further bidding by the Director of Procurement and also will not be approved as a subcontractor so long as the delinquency status exists. Also, any individual, firm, partnership or corporation affiliated with a delinquent Contractor to the extent that it is dependent upon the delinquent Contractor for either personnel, equipment, or finances shall likewise be disqualified. The Owner additionally reserves all rights and options pertaining to available legal remedies for such delinquency. A Contractor disqualified under the requirements of this Article will be removed from a delinquent status upon receipt of satisfactory evidence by the Owner's Project Manager and approval of

SECTION II.: THE WORK (... Continued)

Procurement that its progress is no longer delinquent, provided the contract time has not lapsed.

- (5) The principal progress verification will occur monthly and will generally coincide with receipt by the Owner's Project Manager of the Contractor's monthly Application for Payment and Work Progress Schedule.
- (6) Preliminary notices of delinquency will be sent to the Contractor by facsimile mail immediately thereafter, and confirmed by certified mail. The Contractor, once given such a preliminary notice of delinquency, will not be finally declared delinquent until a period of 10 calendar days after the preliminary notice has elapsed. During this 10-day period, the affected Contractor may request an extension of time or present other considerations that would affect its delinquency to which it feels it is entitled. Final notification of delinquency will be made by certified mail after the expiration of this 10-day period provided no extensions of time or other considerations are deemed proper by the Owner, and provided the delinquency status has not been corrected. Contractor shall provide an acceptable recovery schedule to Owner for approval.

Owner's failure to terminate for delinquency shall not serve as a waiver by the Owner.

- (7) The Owner may grant extensions of time during the prosecution of the Work, as allowed under the contract provisions regardless of the Contractor's delinquency status. The contract will be considered complete when all Work has been completed and accepted by the Owner, and final payment has been issued to the Contractor.

3. Substantial Completion

The Substantial Completion, as defined in the "Definitions" of Section I.1. g, will be initiated in writing by the Contractor and/or the Owner for the purpose of making available the stated Work, or a specified part thereof, for its intended use. The Owner and the Contractor will conduct an inspection of the stated Work for compliance with the contract documents. The Owner will have prepared a written Punch List of all items and/or the deficiencies for the Work covered by the Certificate of Substantial Completion, the Punch List shall also include an estimated cost to complete each item on the list. The Owner and Contractor shall collectively review the Punch List and estimated costs within 30 calendar days (may be extended to 45 calendar days for projects with an estimated cost of \$10 million or more) of reaching substantial completion and use all reasonable effort to mutually agree on the Punch List and associated estimated costs. If there is a good faith dispute as to the Punch List and estimated costs, Owner reserves the right to retain any amounts required to complete the Punch List at its discretion, in compliance with Florida Statutes. The Punch List shall become a part of the Certificate of Substantial Completion and must be completed prior to final

SECTION II.: THE WORK (... Continued)

acceptance of the Work. If the Owner agrees that the Work is ready for occupancy, a Certificate of Substantial Completion will be prepared by the Owner on the form included in the contract documents. The Statement shall be completed in its entirety and shall be signed by the Engineer, Contractor, Tenant and Owner, where applicable. The Owner and Contractor agree to work cooperatively in the event the Punch List must be supplemented based on the disclosure of defective or incomplete work.

4. Tests and Inspections

- a. Except as specifically stated in writing by the Owner, the Contractor shall establish and conduct its own quality testing program for materials and other Work performed thereon under this contract. Testing may include but not be limited to soils, aggregates, compaction, masonry, concrete, asphalt, painting, metals, pressure tests, welding, coatings, insulation, water quality, electrical circuitry, machinery, equipment or other applicable items. The Contractor shall, prior to the Preconstruction Conference, furnish electronically in Trimble Unity Construct (E-Builder) to the Owner a listing or schedule of testing it proposes to conduct for informational purposes. Results of such tests as performed by the Contractor shall be furnished electronically in Trimble Unity Construct (E-Builder) to the Owner within 48 hours of such testing, for information. No separate payment will be made by the Owner for any testing accomplished by the Contractor but the cost thereof will be considered as included in the overall contract price for the related items of Work.
- b. The Owner may employ, at its expense, an independent testing laboratory for the purpose of performing such tests as may be deemed necessary by the Owner.

If any Work or materials are found to be deficient as a result of such tests, the Contractor shall promptly correct same, or replace, in accordance with the specifications, and it may be required to revise and upgrade both construction and quality control procedures. If the Owner deems it necessary that additional testing shall be made of such correction or replacement, the Contractor shall pay the costs thereof.

- c. The Owner reserves the right to inspect any and all parts of the Work underway for conformance with the contract requirements. The making of tests by the Contractor, regardless of their indication, shall not relieve the Contractor of sole responsibility for Work that is defective or not in accordance with the requirements of the contract.

Should the cost of remediation of deficient work be commercially wasteful, the Owner at its sole option may retain the nonconforming work for no cost to the Owner for that work.

SECTION II.: THE WORK (... Continued)

5. Time

- a. All time limits stated in the contract documents shall be consecutive calendar days unless otherwise stated.
- b. The contract completion time shall be as shown in the "Special Conditions". Timely completion is an essential element of this contract. Prevailing conditions of weather and environment at the worksite and the Owner's continuing port operations in the vicinity have been taken into account in establishing the contract time allowed for the Work.
- c. The Notice to Proceed will not be given until after receipt of evidence of insurance (in the manner specified) and contract bonds, and following the Preconstruction Conference. If the Preconstruction Conference is waived by the Owner, the Notice to Proceed will be issued immediately upon receipt of the required bonds and certificates by the Owner.

6. Warranties and Guarantees.

- a. The Contractor shall correct any Work that fails to conform to the requirements of the contract documents where such failure to conform appears during the progress of the Work, and shall remedy any defects due to faulty materials, equipment or workmanship which appears within the warranty period. The Warranty Period is as specified in the "Special Conditions", unless the Technical Specifications require a longer warranty period for all or portions of the Work. The provisions of this condition apply to work done by subcontractors, as well as to work done by direct employees of the Contractor. The Contractor shall insure that its subcontractors/suppliers are bound by this requirement.
- b. The Contractor shall furnish all written warranties/guarantees for any materials or equipment electronically in Trimble Unity Construct (E-Builder), which are required under this contract, or separately warranted by the manufacturers. Final payment shall be withheld from the Contractor until all warranty documents have been furnished to the Owner. All warranties shall be issued consistent with the requirements of these contract documents.

GENERAL CONDITIONS

SECTION III.: CHANGES AND DISPUTES

1. Changed Conditions.

The Contractor shall promptly and before such conditions are disturbed, notify the Owner in writing of: a) subsurface or latent physical conditions at the site differing materially from those indicated in the contract documents, b) previously unknown physical conditions at the site of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in Work of the character provided for in this contract, or c) underground utilities or other obstructions not shown on the plans or reasonably expected to exist in the way of the Work at such location(s).

Notification shall be within 5 calendar days of discovery by the contractor. The Owner shall promptly investigate the conditions, and if it finds that such conditions do so materially differ and cause an increase or decrease in the Contractor's cost of, or the time required for performance of this contract, an equitable adjustment may be made, and the contract modified in writing accordingly by Change Order. Any claim by the Contractor for adjustment under this clause shall not be allowed unless timely notification has been made by the Contractor, or unless the Owner has granted a further period of time for determination of the extent of delay, magnitude of changed conditions, or determination of corrective action required.

2. Changes in the Work.

a. Change Orders - General. JAXPORT does not anticipate the issuance of Change Orders to the contract. The Contractor should not anticipate Change Orders; nor view any Change Orders that should occur as the opportunity for windfall profit. The Owner may authorize changes in the work consisting of additions, deletions or modifications to scope or schedule and the contract price or time (or both) being adjusted accordingly. All such changes in the Work shall be authorized by a written Change Order which shall document the change and specify any contract modifications such as price or schedule. No changes to the Work are authorized until the Contractor and the Owner have executed a formal Change Order. Verbal instructions do not constitute a Change Order.

(1) Either the Owner or the Contractor may initiate a Change Order request. In either event, the Contractor shall promptly prepare and submit electronically in Trimble Unity Construct (E-Builder) to the Owner a detailed justification for the Change Order request (when initiated by the Contractor) and a detailed quotation for the changed work, both time and money. The detailed quotation shall be complete and definitive as to the true costs of the changed work. The Owner will also require a complete breakdown of all costs that will be experienced by Contractor and all sub-tier contractors. Single line statements are not acceptable. The breakdown of costs may include, but are not limited to:

SECTION III.: CHANGES AND DISPUTES (... Continued)

- Labor Hours (broken down by craft)
- Materials (broken down by units)
- Equipment (broken down by units)
- Transportation (specify)
- Supervision (specify)
- Taxes (specify)
- Permits (specify)
- Insurance and Bonding (specify)
- Mobilization (show detail of cost)
- Demobilization (show detail of cost)
- Any other information requested by the Owner
- Mark-up for Profit and Overhead (see Section III 2.a.2.)

The breakdown of time shall include a thorough justification for any extension of the contract completion date which may include a time impact analysis, if requested by the Owner. Only those items of Work that directly affect the "critical path" of the Project will be considered for time extension.

Additional equipment costs on change orders: For any machinery or special equipment (other than Small tools), including fuel and lubricant, the Contractor will receive 80% of the "Rental Rate Equipment Watch or an amount less than" for the actual time that such equipment is in operation on the work, and 40% of the "Rental Rate Equipment Watch or an amount less than" for the time the equipment is directed to standby and remain on the project site, to be calculated as indicated below. The equipment rates will be based on the latest edition (as of the date the work to be performed begins) of the "Rental Rate Equipment Watch for Construction Equipment or an amount less than" or the "Rental Rate Equipment Watch for Older Construction Equipment or an amount less than," whichever is applicable, as published by Equipment Watch, Penton Media, Inc. (version current at the time of bid), using all instructions and adjustments contained therein and as modified below. On all projects, the Engineer will adjust the rates using regional adjustments and Rate Adjustment Tables according to the instructions in the Equipment Watch.

Allowable Equipment Rates will be established as set out below:

(1) Allowable Hourly Equipment Rate = $\text{Monthly Rate} / 176 \times \text{Adjustment Factors} \times 80\%$ or an amount less than.

(2) Allowable Hourly Operating Cost = $\text{Contractors Documented Cost} \times 80\%$ or an amount less than.

(3) Allowable Rate per Hour = $\text{Rental Rate Equipment Watch Hourly Equipment Rate} \times 80\% + \text{Contractors Hourly Operating Cost}$ or an amount less than.

(4) Standby Rate = $\text{Allowable Hourly Equipment Rate} \times 40\%$ or an

SECTION III.: CHANGES AND DISPUTES (... Continued)

amount less than.

The Monthly Rate is The Basic Machine Rate plus Any Attachments or an amount less than.

Standby rates will apply when equipment is not in operation and is directed by the Engineer to standby at the project site when needed again to complete work and the cost of moving the equipment will exceed the accumulated standby cost. Standby rates will not apply on any day the equipment operates for eight or more hours. Standby payment will be limited to only that number of hours which, when added to the operating time for that day equals eight hours. Standby payment will not be made on days that are not normally considered work days on the project.

JAXPORT will allow for the cost of transporting the equipment to and from the location at which it will be used. If the equipment requires assembly or disassembly for transport, JAXPORT will pay for the time to perform this work at the rate for standby equipment or an amount less than.

Equipment may include vehicles utilized only by Labor, as defined above.

- (2) The percentage mark-up for those items listed in Section III, Paragraph 2.a.1. shall be limited to 15 percent. All subcontract costs will be limited to 5 percent mark-up per tier, with a maximum of 10% regardless of the number of tiers.
- (3) All submissions of costs shall be in a form that is acceptable for verification by the Owner. Vendor quotations or Purchase Orders shall support material costs. Labor and supervision costs shall be supported by typical certified payroll documents. Equipment costs must be within the norm of published equipment rental rates for the Jacksonville area.
- (4) The pricing of Change Orders shall be determined in one of three ways:
 - (a) For changes in Work for which unit prices were already established in the contract, the established unit prices shall also apply to work performed under the Change Order. Established contract unit prices are all inclusive of costs, overhead and profit and shall not incur any additional mark-up.
 - (b) Force Account: Upon written directive of the Owner, the Contractor shall perform the work utilizing the "time and materials" method of pricing, under which all costs are auditable and payment to the Contractor will be limited to those actual expenses, plus the mark-ups allowed in Section III. 2.a. (2). The Change Order will be limited to an estimated cost not-to-exceed amount for fiscal control. Should this amount be reached due to unforeseen conditions, an additional Change Order will be

SECTION III.: CHANGES AND DISPUTES (... Continued)

sought.

- (c) By agreement of both parties of a lump sum amount for the change to the contract. Determination of the lump sum amount will require submission of a breakdown of costs as detailed in Section III.2.a.(1) and mark-ups applied from Section III. 2.a.(2), and any other information reasonably requested by Owner.
- b. Change Order Form. All Change Orders shall be executed on the form approved by JAXPORT. Execution of a Change Order resolves all issues of time and compensation. No other method of reservation of rights shall be recognized.
- c. The Contractor shall keep and present in such form as the Owner may direct, a correct and current account of all direct costs of the Work performed. All documentation shall be maintained according to generally accepted accounting practices (GAAP), in such form and detail as to be audited for accuracy and content. JAXPORT'S Project Manager shall periodically check and certify the costs. Payments shall be made to the Contractor based upon the certified costs of the Contractor, with mark-ups, as set forth in Section III.2.a.(2).
- d. Bond Liability. Any changes made in the specifications for the work by Change Order (whether such changes increase or decrease the amount thereof) or any change in the manner or time of payments made to the Contractor, or any change in the contract completion date occasioned by changed Work shall not, in any way, annul, release or affect the liability on the bond provided by the Contractor. The Contractor is solely responsible for notification of Surety of any Surety changes.

Notwithstanding the foregoing, it is understood and agreed that the Owner may, at any time, issue written instructions to the Contractor requiring changes within the scope of the work or schedule that are consistent with the general intent of the contract documents, at no extra cost to the Owner.

3. Claims.

- a. Claims for Extra Work. If the Contractor considers that any written instructions, acts, or omissions of the Owner or any of the Owner's agents, employees, consultants, contractors, subcontractors or suppliers have caused or will cause the Contractor to incur extra costs or time not included in the contract documents, the Contractor shall give written notice to Owner of such claim within 5 calendar days after the initial date of such acts, omissions, instructions or occurrence, and shall not proceed with the Work until receipt of the Owner's written directive to do so. Upon receipt of such a directive, the Contractor shall proceed in accordance therewith even though agreement may not have been reached as to whether said instructions require work that is within or outside of the scope of the contract documents or, if outside, the amount of the equitable price or time

SECTION III.: CHANGES AND DISPUTES (... Continued)

adjustment to which the Contractor is entitled for the performance thereof. No claim for such extra costs or time shall be allowable in the absence of the written directive of the Owner and the timely written notice by the Contractor. In the absence of either or both, the Contractor's claim for extra costs or time on account thereof shall be deemed to have been waived.

- b. Claims for Damages. Should the Contractor suffer injury or damage to any other party because of any act or omission of the other party or of any of its employees, agents, or others for whose acts it is legally liable, claim shall be made in writing to the Owner within 5 calendar days after the first observance of such injury or damage.
 - (1) Should the "no damages for delay" clause not be enforced by the court, the Contractor waives any claim for extended home office overhead that may result from any delay on the project.
 - (2) The Contractor specifically waives any right to seek attorney's fees and construction claim preparation costs from the Owner.
 - (3) The Contractor shall not present nor recover on any claim from the Owner based on any formula(s), hypothetical or statistical methodologies used in damage computation. The Contractor may only recover if it can provide documented pay records specifically indicating any alleged damage, loss, or cost.

4. Completion of Work by Owner

Upon declaration of default, the Owner shall have full power and authority to appropriate and/or use any or all materials and equipment on the site which are suitable and acceptable, and may enter into an agreement with others for the completion of the Work under the contract, or may use other methods which in the opinion of the Project Manager are required for the completion of the Work in an acceptable manner. All costs and charges incurred by the Owner because of the Contractor's default, including the costs of completing the Work under the contract, shall be charged against the Contractor and its Surety. In case the expense so incurred by the Owner is less than the sum which would have been payable under the contract if it had been completed by the defaulting Contractor, the defaulting Contractor shall be entitled to receive the difference.

Owner reserves their right to supplement, with additional workers and equipment, the Contractor's forces if Contractor is not reasonably projected to complete the project in a safe and timely manner. Owner shall give the Contractor 10 day's written notice of its intent to utilize supplemental forces. The Contractor shall have the primary responsibility to coordinate all work on the project and shall fully cooperate with all other forces.

In case the expense incurred by the Owner pursuant to this Section exceeds the sum which would otherwise have been payable under the contract, then the Contractor and its Surety shall be liable and shall pay the Owner the amount of the excess.

SECTION III.: CHANGES AND DISPUTES (... Continued)

If, after the 10-day default notification period, and prior to any action by the Owner to otherwise complete the Work under the contract, the Contractor should convincingly establish its intent and ability to prosecute the Work in accordance with the Owner's requirements, the Owner may elect to permit the Contractor to resume the Work in which case any costs to the Owner incurred by the delay or from any reason attributable to the delay will be reimbursed by the Contractor or Surety.

5. Default and Termination

- a. If the Contractor fails to begin the Work under the contract promptly upon receipt of the Notice to Proceed, or fails to perform the Work with experienced and effective supervision, sufficient workers, sufficient equipment, or sufficient materials to assure the prompt completion of the contract (i.e., the Contractor is declared delinquent), or performs the Work unsuitably, or neglects or refuses to remove materials or to perform anew such Work as may be rejected as unacceptable and unsuitable, or discontinues the prosecution of the Work, or fails to resume Work which has been discontinued, or becomes insolvent or is declared bankrupt, or files for reorganization under the bankruptcy code, or commits any act of bankruptcy or insolvency, either voluntarily or involuntarily, or allows any final judgment to stand against them unsatisfied for a period of 10 calendar days, or makes an assignment for the benefit of creditors, or fails to comply with contract requirements regarding minimum wage payments, E.E.O. or JSEB requirements, or for any other cause whatsoever fails to carry on the Work in an acceptable manner, or if the Surety executing the bond for any reasonable cause becomes unsatisfactory in the opinion of the Owner, the Owner will give notice in writing to the Contractor and its Surety of such delay, neglect, delinquency or default.
- b. If the Contractor, within a period of 10 calendar days after written notice of default from the Owner delivered to the Contractor's representative on the jobsite, or by facsimile transmission and confirmed by certified mail, does not proceed to correct the conditions of which complaint is made, the Owner shall, upon written notification from its Project Manager of such delay, neglect, or default and the Contractor's failure to correct such conditions, have full power and authority without breaching the contract to take the prosecution of the Work out of the hands of the Contractor and to declare the contract in default and make demands upon the Surety consistent with the rights set forth in the Performance Bond attached herein.
- c. The Owner may, after written notice to the Contractor, terminate the contract or a portion thereof for just cause such as default or for other reasons which are determined to be in the interest of the Owner. Such reasons for termination may include but are not necessarily limited to national defense or national emergency which creates a serious shortage of materials, orders from duly constituted authorities relating to energy conservation, and restraining order or injunctions obtained by third-party

SECTION III.: CHANGES AND DISPUTES (... Continued)

citizen action resulting from national or local environmental protection laws or where the issuance of such order or injunction is primarily caused by acts or omissions of persons or agencies other than the Contractor and unacceptable interference with Operations.

- d. When a contract or any portion thereof is terminated before completion of all items of Work in the contract, payment will be made for the actual number of units or items of Work completed at the contract unit price, or as mutually agreed for items of Work partially completed or not started. No claim for loss of anticipated profits shall be allowed and are specifically waived by Contractor.
- e. Reimbursement for mobilization expenses (when not otherwise included in the contract) including moving equipment to the job will be considered where the volume of Work completed is too small to compensate the Contractor for these expenses under the contract unit prices; the intent being that an equitable settlement will be made with the Contractor.
- f. Acceptable materials procured by the Contractor for the Work that have been inspected, tested, and approved by the Owner, and that are not incorporated in the Work may be purchased from the Contractor at actual cost as shown by receipted bills and actual cost records at such points of delivery as may be designated by the Project Manager.
- g. Termination of a contract or a portion thereof under the provisions of this sub-article shall not relieve the Contractor of its responsibilities for the completed portion, nor shall it relieve its Surety of its obligation for and concerning any claims arising out of the Work performed.
- h. JAXPORT shall have the absolute right to terminate in whole or part the Contract, with or without cause, at any time after Award upon written notification of such termination.

In the event of termination for convenience, JAXPORT will pay the Company for all disbursements and expenses that the Company has incurred, or those for which it becomes obligated prior to receiving JAXPORT's notice of termination. JAXPORT will also pay the Company costs incurred less the reasonable resale value, of materials or equipment that the Company has already ordered, obtained or fabricated in connection with the Contract.

Upon receipt of such notice of termination, the Company shall stop the performance of the Work hereunder except as may be necessary to carry out such termination and take any other action toward termination of the Work that JAXPORT may reasonably request, including all reasonable efforts to provide for a prompt and efficient transition as directed by JAXPORT.

JAXPORT will have no liability to the Company for any cause whatsoever arising out of, or in connection with, termination including, but not limited to, lost profits, lost opportunities, resulting change in business condition, except as expressly stated within these Contract Documents.

SECTION III.: CHANGES AND DISPUTES (... Continued)

6. Delays and Extensions of Time

In the event that the Contractor, in the performance of the Work, encounters inefficiencies, disruptions, or delays as a result of the partial suspension or resequencing of work thereof, or incidental interference therewith by the Owner or its other contractors, or as a result of other unforeseeable causes beyond the control and without fault or negligence of the Contractor such as, but not limited to, Acts of God, fire, flood, war, governmental priority controls, railcar shortages, general strikes, and labor work stoppages, the Contractor shall notify the Owner in writing within 5 calendar days of the commencement of the delay that he intends to request additional time for contract completion. Such requests for additional time shall be decided by the Owner within 5 working days of receipt of notification and if a time extension is approved, it shall be authorized by Change Order. In the event of a continuing delay having a single cause, notification as above is required, however, a determination by the Owner as to time extension allowed will not be made until the Contractor has submitted electronically in Trimble Unity Construct (E-Builder) complete facts as to the reason and total extent of the delay, including such documentation as may be reasonably required by the Owner. No time extension shall be granted for delays occurring more than 5 calendar days before written notification is made to the Owner, and no time extension shall be granted for any delay caused or occasioned by fault, negligence, omission, or failure to timely prosecute the Work, including procurement delays on the part of the Contractor, its agents, suppliers, employees, or subcontractors. The Contractor shall also take immediate action upon incurring such delay to minimize the effects of that delay. The allowability and length of any such time extension shall be determined in writing. In making that determination, no extension of time will be allowed the Contractor for delays encountered in one or more phases of the Work that can be overcome by reasonable readjustments of the Contractor's planned progress on other phases of the Work. Only critical path delays will be recognized for an extension of time. All requests for an equitable time extension shall be accompanied with a time impact analysis.

- a. Time extensions may also be allowed on the same terms and conditions as set forth above, in the event that the Contractor over the course of the Work encounters unusually adverse weather in excess of the norm for the locality. The Contractor expressly agrees that in undertaking to complete the Work within the time specified, it has made allowance for all hindrances including adverse weather and delays which might normally be expected to occur in performing the Work. No claims shall be made for money by the Contractor for such hindrances and delays.
- b. The Contractor's sole and exclusive remedy for delays and inefficiencies as described herein shall be an equitable extension of time. The Contractor shall not be entitled to any additional compensation or payment for extra costs or damages incurred by them due to hindrances of, or delays to, the progress of the Work. Any claim related to delay shall be in writing and include a time impact analysis.

SECTION III.: CHANGES AND DISPUTES (... Continued)

- c. No extensions of time will be granted due to Contractor's failure to protect the site, materials, or working conditions from adverse weather conditions including, but not limited to site drainage, storage, and temporary enclosures as needed.
- d. No extensions of time will be granted due to Contractor's failure to diligently prosecute the contract, including, but not limited to, procurement delays.
- e. Under no circumstances shall any claim for additional costs be accepted based upon a hypothetical formula, Means or other estimated costs. All claims shall be presented utilizing discrete data evidencing direct costs to project.
- f. Contractor waives any claims for attorney fees and claims consultant costs.

7. Disputes

Except as otherwise provided in this contract, any dispute concerning a question of fact arising under this contract which is not disposed of by agreement with the Project Manager shall be decided by appeal to the Chief Executive Officer of JAXPORT. The Chief Executive Officer shall, within 30 days of receipt of the written appeal, reduce its decision to writing, and mail or otherwise deliver a copy to the Contractor. The 30-day period may be extended in 30-day increments by written order of the Chief Executive Officer, or its designee, when and if it determines that additional studies or investigations are necessary to render a decision. This decision shall be final and conclusive, unless within 30 days after receipt thereof by the Contractor, the Contractor mails or otherwise delivers to the Chief Executive Officer a written appeal addressed to the Chairman of JAXPORT. In connection with the appeal proceeding under this clause, the Contractor shall be given an opportunity to be heard and to offer supportive evidence to its appeal. Pending final decision on the dispute should the project be ongoing, the Contractor shall proceed diligently with the performance of the contract in accordance with the Chief Executive Officer's decision. The decision on the appeal shall be rendered by JAXPORT's Governing Body and shall be final and conclusive unless determined by subsequent judicial review to have been fraudulent, capricious, so grossly erroneous as to imply bad faith, or not supported by any substantial evidence.

Compliance with this process shall be a condition precedent before any litigation can be brought to appeal any decision.

8. Recovery Rights, Subsequent to Final Payment

The Owner reserves the right should an error be discovered in the partial or final Applications for Payment, or should proof of defective Work or materials used by or on the part of the Contractor be discovered after the final payment has been made to claim and recover from the Contractor or its Surety, or both, by process of law, such sums as may be sufficient to correct the error or make good the defects, errors, or omissions in the Work and materials.

SECTION III.: CHANGES AND DISPUTES (... Continued)

All records pertaining to the Project shall be retained by the Contractor for a period of three years from the date of final acceptance of the Project, unless additional time for retention is requested in writing by the Owner. Upon request, all such records shall be made available to the Owner or its representative. For the purpose of this Section, records shall include all books of account, supporting documents, both paper and electronic, and papers deemed necessary by the Owner to assure compliance with the contract provisions, photographs, videos, video tapes and project pictures stored electronically. Contractor shall reasonably cooperate with the Owner in obtaining and reviewing all documentation herein.

GENERAL CONDITIONS

SECTION IV.: ADMINISTRATIVE

1. "As-built" Drawings and Equipment Manuals

- a. At the completion of the Work under this contract, the Contractor shall prepare and deliver electronically in Trimble Unity Construct (E-Builder) to the Owner one complete set of the construction drawings indicating As-built conditions. Final As-built drawings submissions shall consist of:

- (1) Adobe Acrobat format (.pdf) – 1 complete set
- (2) Latest version of AutoCAD format (.dwg) to include external references

Final payment shall be withheld from the Contractor until acceptable "As-built" drawings are furnished to the Owner.

- b. The Contractor shall furnish electronically in Trimble Unity Construct (E-Builder) a complete set of operations and maintenance instructions together with the repair parts lists for all mechanical and electrical equipment. Those instructions shall be prepared and published by the manufacturer, and shall be delivered to the Owner prior to the final inspection. Final payment shall be withheld from the Contractor until such documents are furnished to the Owner.

2. Conferences

- a. Unless waived by agreement of both parties, a Preconstruction Conference will be held at a mutually convenient time as soon as is practicable following award of this contract; normally, within 21 calendar days thereafter. The Preconstruction Conference shall be attended by responsible representatives of the Owner, and the Contractor and its subcontractors. The Contractor, its subcontractors and its suppliers are expected to be fully familiar with the contract documents and specific Project requirements by the time set for the Preconstruction Conference and the Owner may reasonably presume such notwithstanding paragraph "c" of the "Contract Documents" Section I of these General Conditions. The Contractor shall then present for discussion at the meeting any questions, concerns, discrepancies, need for clarifications and any other significant issues which may in any manner affect the project schedule or its performance of the Work for these issues discussed after the award of contract. Written clarifications and/or interpretations of the contract documents shall be furnished to the Contractor without unreasonable delay. Written "Minutes" of the Preconstruction Conference will be prepared by the Owner, with copies provided to all attendees and which the "Minutes" shall be retained.

The Contractor shall deliver to the Owner at the Preconstruction Conference the specified copies of:

- Schedule of Values (where applicable).

SECTION IV.: ADMINISTRATIVE (... Continued)

- Quality control program.
 - List of project subcontractors.
 - List of Contractor's project management team with telephone numbers.
 - Identification of major suppliers and/or manufacturers to be used on the project.
 - Schedule for, and listing of, shop drawing submittals.
 - Other documents as may be required elsewhere in these specifications.
- b. The Contractor or Owner may request conferences for other useful purposes at convenient times throughout the contract period. Representatives of all concerned parties shall receive reasonable notice of any such meeting.

3. Payments

Unless otherwise specified in the section of "Special Conditions" and upon receipt electronically in Trimble Unity Construct (E-Builder) of the Contractor's Application for Payment (Forms AFP-1 and AFP-2), payment for this Work will be made as follows:

- a. Payment will be made once each month in the amount of 95 percent of the value of completed Work, based on contract prices of labor and materials incorporated in the Work and of materials suitably stored at the site thereof for incorporation in the Work, as estimated or approved by the Owner's representative less the aggregate of previous payments. Within twenty (20) business days after the development of the Punch List, as defined above, and after receipt of a proper invoice or payment request, Owner, through the Project Manager, will pay the remaining balance of the contract, including any remaining retainage less an amount equal to 150% of the estimated costs to complete the items on the Punch List. *See* §§ 218.735(7)(e) and 255.077(4), Fla. Stat. Final payment, will be made after closeout of the Work has been satisfactorily completed and all requirements of the contract documents have been fulfilled. Florida Statutes do not require Owner to pay or release any amounts that are subject of a good faith dispute made in writing pursuant to the contract or are the subject of a claim brought pursuant to § 255.05, Florida Statutes.
- b. The Contractor shall submit electronically in Trimble Unity Construct (E-Builder) to the Project Manager a proposed Schedule of Values of the various portions of the Work, including line item quantities aggregating to the total contract sum, through Trimble Unity Construct (E-Builder) and prior to the Preconstruction Conference. This schedule, when approved by the Project Manager, shall be used as a basis for the Contractor's application for payments. The Contractor shall update this schedule each time a Change Order affecting the contract total price is approved. The contract price will be adjusted to provide payment for the actual quantities of unit price items as they are completed and accepted. The following items are required with each AFP:

SECTION IV.: ADMINISTRATIVE (... Continued)

- (1) Form AFP-1 Application for Payment
- (2) Form AFP-2 Schedule of Values
- (3) Progress Schedule
- (4) JSEB Form 5
- (5) Narrative Report that addresses:

Work Performed

Work Planned

Problems

Open Issues

- (6) Photographs (See Section SC, Item 11 for detailed requirements.)

- c. Payments may be withheld for failure of the Contractor to comply with the provisions of the contract documents, including but not limited to:

- (1) Defective work not remedied.
- (2) Failure of the Contractor to make payments properly to subcontractors or for labor, materials, or equipment.
- (3) Any delay or damage to another Contractor, upon certification by injured Contractor, of the cause and amount of any said damage.
- (4) Unsatisfactory prosecution of the Work by the Contractor.

Payments may also be withheld if claims have been filed or there is reasonable evidence indicating the probable filing thereof, or if Contractor's Surety for this Project so requests in writing.

Withholding of payments is a remedy in addition to all other remedies available to the Owner. Where pursuant to condition (2) of this paragraph, a contractor certifies to the Owner the necessity to withhold progress payments to another contractor, the certifying contractor shall defend, indemnify, and hold harmless the Owner from any and all claims or suits arising from such action, which is discretionary with the Owner.

- d. Whenever Mobilization and Demobilization are a part of the bid items, Mobilization will account for and be paid out at sixty percent (60%) and Demobilization will account for and be paid out at forty percent (40%).
- e. Whenever any change or combination of changes in the Work results in an increase or decrease in the original estimated contract quantities, and the Work added or eliminated is of the same general character as that shown on the original plans, the Contractor shall accept payment in full at the original contract unit prices for the actual quantities of work done, and no allowance will be made for any loss of anticipated profits because of increases or decreases in quantities provided, however, that any increased or decreased work covered by a Change Order shall be paid for as stipulated therein.
- f. Final payment shall not be made until the Contractor has delivered to the

SECTION IV.: ADMINISTRATIVE (... Continued)

Owner any required submittals, the Certificate of Contract Completion (Form FCC); Consent of Surety to Final Payment (Form CONSUR), including valid Power of Attorney, and JSEB Form 5.

- g. No payment by the Owner shall be construed to be acceptance of defective Work or improper materials. Contractor warrants and guarantees that title to all work, materials, and equipment covered by any Application for Payment, whether incorporated into the Project or not will pass to the Owner at time of final payment, free and clear of all liens, claims, security interests and encumbrances.
- h. Payments will be made within 20 business days after receipt of Contractor's properly documented invoice(s), unless returned for correction of invoice(s), or submission of additional substantiation.
- i. The acceptance of final payment shall constitute a waiver of all claims by the Contractor except those specifically preserved according to the provisions of these contract documents.
- j. The Owner may at any time have access to the Contractor's records for the purpose of auditing the financial and contractual performance of the Contractor. The Owner may obtain copies of all financial and scheduling computer disks at any time from the Contractor, and shall have reasonable access to all other documents except those that would be privileged under Florida law. The Owner may audit the financial records of the Contractor at any reasonable time, at its own expense.

4. Progress Schedule

The Contractor shall prepare for the Owner's approval a progress schedule for the Project showing the dates for the starting and completion of the various items of construction. The schedule shall be prepared in Microsoft Project (or equivalent) format, unless the Technical Specifications provide for a more detailed progress schedule.

Four (4) copies shall be furnished to the Owner's representative at the Preconstruction Conference. This schedule, after approval, shall be used by the Owner as the primary means of determining satisfactory execution of the Work by the Contractor. No payments will be made to the Contractor until the schedule is approved. All proposed Change Orders will include a revised schedule.

Should the Contractor fall behind the approved schedule, it shall provide a recovery schedule and be required to revise methods or operations, increase its forces (labor and equipment), work extra hours per day, and/or work extra days per week as necessary until the scheduled progress is acceptable, at no extra compensation by the Owner. Failure on the part of the Contractor to take necessary and sufficient actions in this regard and to put the Project back on schedule within a reasonable time, not to exceed 30 calendar days after notification by the Owner of such delinquency, shall be considered sufficient grounds for termination of the contract. The decision by the Owner not to

SECTION IV.: ADMINISTRATIVE (... Continued)

terminate shall not constitute a waiver or preclude the termination for default as appropriate.

Any delays encountered during the construction which may be excusable under the provisions of these "General Conditions" shall be brought to the Project Manager's attention in accordance with the provisions. The approved Project schedule may, depending on the Project Manager's decision, be adjusted accordingly.

GENERAL CONDITIONS

SECTION V.: INSURANCE AND BOND - Refer to C-1965 for "Required Limits of Insurance" pages RLI-1 TO RLI-3

1. Insurance and Indemnification.

- a. The Contractor shall not commence Work until the Contractor has procured the insurance required under this Section and such insurance has been approved by the Owner. The Contractor shall provide evidence of such insurance in the following manner:
 - (1) Contractor agrees, at its sole expense, to maintain on a primary, non-contributory basis during the life of this Contract or performance of Work hereunder, insurance coverages, limits, and endorsements unless otherwise noted herein. Contractor agrees to provide evidence of Commercial General Liability, Contractor's Professional Errors and Omissions Liability and Commercial Umbrella/Excess Liability coverages at execution of the Contract. The other coverages required herein for Business Auto Liability, Contractor's Pollution Legal Liability, Inland Marine Builder's Risk Insurance, and Workers' Compensation. In the event the Contractor performs any site work, other than testing, then all insurance required herein will need to be evidenced prior to commencement of said site work.
 - (2) The Contractor agrees the insurance requirements herein as well as JAXPORT's review or acknowledgement, is not intended to and shall not in any manner limit or qualify the liabilities and obligations assumed by the Contractor under this Contract.
 - (3) As evidence of compliance with the insurance required by Paragraph "c.", Subparagraphs 1 (Workers' Compensation/Employers' Liability), 2 (Commercial General Liability) and 3 (Business Auto) below, the Contractor shall furnish the Owner with a Certificate of Insurance Compliance (Form 101-87) signed by an authorized representative of the insurer(s) providing the coverage. The specified form must be used; no substitutions will be permitted.
 - (4) As evidence of compliance with the insurance required by Paragraph "c.", Subparagraph 4 (Protection for Owner) below, the Contractor shall furnish the Owner with either the original of the Owner's and Contractor's Protection Liability Policy(ies) or a Certificate of Insurance Compliance (Form 101-87) signed by an authorized representative of the insurer(s) verifying inclusion of the Additional Insured endorsement in the Commercial General Liability Coverage.
 - (5) If this contract includes construction of, or additions to aboveground buildings or structures, or the installation of machinery or equipment into an existing structure as evidence of compliance with the insurance required by Paragraph "c.", Subparagraph 5 (property insurance) below, the Contractor shall furnish the Owner with the original of the

SECTION V.: INSURANCE AND BOND (... Continued)

policy or policies of insurance required and a Certificate of Insurance Compliance (Form 101-87) signed by an authorized representative of the insurer(s).

- (6) With respect only to the insurance required by Paragraph "c.", Subparagraph 4 (Protection for Owner) and Subparagraph 5 (property insurance) below, and then only for a maximum of sixty (60) days from the date of inception of the policy or policies in lieu of the original of any required policy or policies of insurance, the Contractor may furnish an original binder or binders of the insurance signed by an authorized representative of the insurer(s) and a Certificate of Insurance Compliance (Form 101-87) signed by an authorized representative of the insurer(s).
 - (7) Until such time as the insurance is no longer required to be maintained by the Contractor, the Contractor shall provide the Owner with renewal or replacement evidence of the insurance in the manner described by Paragraph "a.", Subparagraphs 1, 2, 3 and 4 below, no less than thirty (30) days before the expiration or replacement of the insurance for which previous evidence of insurance has been provided.
 - (8) Neither approval by the Owner for failure to disapprove the insurance furnished by the Contractor shall relieve the Contractor of the Contractor's full responsibility to provide the insurance as required by this contract.
- b. Insurers providing the insurance required by this contract must meet the following minimum requirements:
- (1) Such insurers must be licensed to write insurance of the required class(es) in the State of Florida, either: a) authorized by subsisting certificates of authority issued to the companies by the Department of Insurance of the State of Florida, or b) with respect only to the coverage required by Paragraph "c.", Subparagraph 1 (Workers' Compensation/Employers Liability) authorized as a group self-insurer pursuant to Florida Statutes 440.57.
 - (2) In addition, such insurers other than those authorized by Florida Statutes 440.57 shall have and maintain throughout the period for which coverage is required a Best's Rating of "A-" or better and a Financial Size Category of "VII" or better according to A. M. Best Company.
 - (3) If, during the period when an insurer is providing the insurance required by this contract, an insurer shall fail to comply with the foregoing minimum requirements, as soon as the Contractor has knowledge of any such failure, the Contractor shall immediately notify the Owner and immediately replace the insurance provided by the insurer, with an insurer meeting the requirements. Until the Contractor has replaced the unacceptable insurer with an insurer acceptable to the Owner, the Contractor shall be in default of this

SECTION V.: INSURANCE AND BOND (... Continued)

contract.

- c. Without limiting any of the other obligations or liabilities of the Contractor, the Contractor shall, at the Contractor's sole expense, procure, maintain and keep in force the amounts and types of insurance conforming to the minimum requirements set forth in this Paragraph "c." Except as otherwise specified in this contract, the insurance shall commence prior to the commencement of work by the Contractor and shall be maintained in force until the contract completion date.

(1) Workers' Compensation/Employers' Liability:

- (a) The Contractor's insurance shall cover the Contractor and its subcontractors of every tier for those sources of liability which would be covered by the latest edition of the standard Workers' Compensation Policy, as filed for use in Florida by the National Council on Compensation Insurance, without restrictive endorsements. In addition to coverage for the Florida Workers' Compensation Act, where appropriate, coverage is to be included for the Longshoremen's and Harbor Workers' Compensation Act, Maritime, including Jones Act, Federal Employers' Liability Act and any other applicable Federal or State laws.

NOTE: If the project is to be accomplished on the face of the wharf, the concrete area where crane rails are located to the edge of the wharf and underneath the wharf (piling, deck repairs, etc.), Longshoremen's and Harbor Workers' Compensation will be required.

- (b) Subject to the restrictions of coverage found in the standard Workers' Compensation Policy, there shall be no maximum limit on the amount of coverage for liability imposed by the Florida Workers' Compensation Act, the Longshoremen's and Harbor Workers' Compensation Act, or any other coverage customarily insured under Part One of the standard Workers' Compensation Policy. The minimum amount of coverage for those coverage's customarily insured under Part Two of the standard Workers' Compensation (inclusive of any amounts provided by an umbrella or excess policy) shall be those amounts stated in Required Limits of Insurance (Form 100-87).

(2) Commercial General Liability:

The Owner shall be named an additional insured on the CGL Policy as well as Umbrella and or Excess policy or policies. The Owner shall not be responsible to pay any deductible sum. This is not meant to extend the Owner's liability beyond Section 768.28, Florida Statutes.

- (a) The Contractor's insurance shall cover the Contractor for those sources of liability which would be covered by the latest occurrence form edition of the standard Commercial General

SECTION V.: INSURANCE AND BOND (... Continued)

Liability Coverage Form (ISO Form CG 2010 07 04 or GC 2010 04 13 Additional Insured – Owners, Lessees, or Contractors-Schedule Persons or Organization, in combination with the GC 2037 10 01) or similar endorsements providing equal or broader Additional Insured Coverage. Commercial General Liability must be filed for use in the State of Florida by the Insurance Services Office, without the attachment of restrictive endorsements other than the elimination of Coverage C., Medical Payments and the elimination of coverage for Fire Damage Legal Liability.

- (b) If the contract value of this Project exceeds \$100,000, the Contractor shall maintain separate limits of coverage applicable only to the work performed under this contract. The minimum limits to be maintained by the Contractor (inclusive of any amounts provided by an umbrella or excess policy) shall be those that would be provided with the attachment of the Amendment of Limits of Insurance (designated Project or Premises) endorsement (ISO Form CG 25 01) to a Commercial General Liability Policy with the minimum amounts stated in the Required Limits of Insurance (Form 100-87).
 - (c) The Contractor shall continue to maintain Products/Completed Operations Coverage for a period of three (3) years after the contract completion date. The insurance shall cover those sources of liability which would be covered by the latest occurrence form edition of Coverage A of the Commercial General Liability Form (ISO Form CG 00 01) or Coverage A of the occurrence form Products/Completed Operations Liability Coverage Form (ISO Form CG 00 37), as filed for use in the State of Florida by the Insurance Services Office, without restrictive endorsements. The minimum limits to be maintained by the Contractor (inclusive of any amounts provided by an umbrella or excess policy) shall be the amounts stated in the Required Limits of Insurance (Form 100-87).
 - (d) Contractor agrees it's coverage will not contain any restrictive endorsement(s) excluding or limiting Products/Completed Operations, Independent Contractors, Broad Form Property Damage, X-C-U Coverage, Contractual Liability, Cross Liability or Separation of Insured's. The Contractor agrees that any self-Insured Retention or deductible shall not exceed \$25,000.
- (3) Business Auto Policy:
- (a) The Contractor's insurance shall cover the Contractor for those sources of liability which would be covered by Part IV of the latest occurrence edition of the standard Business Auto Policy (ISO Form CA 00 01), including coverage for liability contractually assumed, as filed for use in the State of Florida by the Insurance Services Office, without the attachment of

SECTION V.: INSURANCE AND BOND (... Continued)

restrictive endorsements. Coverage shall include owned, non-owned and hired autos.

- (b) The minimum limits to be maintained by the Contractor (inclusive of any amounts provided by an umbrella or excess policy) shall be the amounts stated in the Required Limits of Insurance (Form 100-87).
- (4) Protection for Owner Coverage:
- (a) The Contractor shall provide the Owner with an Owner's and Contractor's Protective Liability Policy (OCP Policy). If the Contractor is unable to procure the minimum amounts of insurance in a single policy, the Contractor may provide the minimum limits through a combination of a primary OCP policy and one or more excess policies. The policy or policies shall cover the Owner for all sources of liability which would be covered by the latest occurrence edition of the standard Owner's and Contractor's Protective Liability Coverage Form, Coverage for Operations of Designated Contractor (ISO Form CG 00 09), as filed for use in the State of Florida by the Insurance Services Office, without the attachment of restrictive endorsements.
 - (b) The Owner shall also be a named an unconditional insured on the OCP Policy and, if applicable, the excess policy or policies. This coverage extends to any act or omission by the Owner, its employees, directors, and agents related to this project. The policy or policies shall be endorsed to include the Owner's officials, officers, agents and employees as insured's. The policy or policies shall include the Contractor and the Contractor's subcontractors of every tier as the contractor designated in the declarations. The coverage is not meant to waive any limits set by Section 768.28, Florida Statutes.
 - (c) The minimum OCP Policy limits per occurrence and if subject to an aggregate, annual aggregate to be provided by the Contractor (inclusive of any amounts provided by excess policies) shall be the same as the amounts shown in the Required Limits of Insurance (Form 100-87) as the minimum per occurrence and general policy aggregate limits respectively required for the Commercial General Liability Coverage. The limits afforded by the OCP Policy and any excess policies shall apply only to the Owner and the Owner's officials, officers, agents and employees and only to claims arising out of, or in connection with, the Work under this contract.
 - (d) The OCP Policy and, if applicable, the excess policy or policies, must be specifically endorsed to provide the Owner with 45 days' written notice of cancellation, non-renewal or restriction.
 - (e) As an alternative to the OCP policy, the Contractor may include the Owner and the Owner's officials, officers, agents, consultants

SECTION V.: INSURANCE AND BOND (... Continued)

and employees as Additional Insured's on the Commercial General Liability Coverage required pursuant to Subparagraph "c.2". If the Additional Insured alternative is selected, the coverage afforded such Additional Insured's shall be no more restrictive than that which would be afforded by adding the Owner and the Owner's officials, officers, agents, consultants and employees as Additional Insured's using the latest Additional Insured - Owners, Lessees or Contractors (Form B) endorsement (ISO Form CG 2010). Certificate of Insurance Compliance shall be clearly marked to reflect use of this alternative.

- (5) Property Insurance:
- (a) If the contract includes construction of, or additions to aboveground buildings or structures, Contractor shall provide all risk Builder's Risk Insurance on a form which is no more restrictive than that afforded by the latest editions of Insurance Services Office Forms CP 00 20 and CP 10 30. If the contract does not include construction of, or additions to aboveground buildings or structures but does involve the installation of machinery or equipment, Contractor shall provide an all risk installation Floater including installation and transit.
 - (b) For Builder's Risk, the amount of insurance is to be 100 percent of the completed value of such addition(s), building(s) or structure(s). For Installation Floater, the amount of insurance is to be 100 percent of the installed replacement cost value. For Builder's Risk, the recovery shall be based on completed replacement cost. For Installation Floater, the recovery shall be based on the installed replacement cost.
 - (c) The Builder's Risk Policy must be specifically endorsed to eliminate any "occupancy clause" or similar warranty or representation that the building(s), addition(s) or structure(s) in the course of construction shall not be occupied without specific endorsement of the policy. The policy must be endorsed to provide that, subject to the notice of cancellation requirement, the Builder's Risk coverage will continue to apply until final acceptance of the building(s), addition(s) or structure(s) by the Owner. The Installation Floater Policy must be specifically endorsed to provide that, subject to the notice of cancellation requirement, the policy shall remain in force until final acceptance of the machinery or equipment by the Owner.
 - (d) The maximum deductible shall be \$5,000.00 per occurrence.
 - (e) The Owner must be included as a named insured for any liability arisen from its acts relating to the project.
 - (f) The policy must be specifically endorsed to provide the Owner with 45 days' written notice of cancellation, non-renewal or restriction.

SECTION V.: INSURANCE AND BOND (... Continued)

- (g) If the contract includes construction of, or additions to, aboveground buildings or structures which are located in a special flood hazard area as defined by the National Flood Insurance Program, flood insurance must be afforded for the lesser of the total insurable value of such buildings or structures, the maximum amount of flood insurance coverage available under the National Flood Program or, the total compensation due Contractor under the contract. If the contract does not include construction of, or additions to, aboveground buildings or structures but does include the installation of machinery or equipment in a building or structure which is located in a special flood hazard area as defined by the National Flood Insurance Program, flood insurance must be afforded for the lesser of the total insurable value of the machinery or equipment or the maximum amount of flood insurance coverage available under the National Flood Program.
- d. The insurance provided by Contractor pursuant to this contract shall apply on a primary basis and any other insurance or self-insurance maintained by the Owner or an Owner's official, officer, agent or employee shall be excess of and not contributing with the insurance provided by or on behalf of the Contractor.
- e. Except with respect to the Property Insurance, the coverage maintained by the Contractor shall apply on a first dollar basis without application of a deductible or self-insured retention.
- f. Compliance with the insurance requirements of this contract shall not limit the liability of the Contractor, its subcontractors, employees, or agents to the Owner or others. Any remedy provided to the Owner or the Owner's officials, officers, agents and employees by the insurance shall be in addition to and not in lieu of any other remedy available under this contract or otherwise.
- g. Indemnification.
 - (1) The Contractor shall indemnify, defend and hold harmless the JPA, its employees and elected officials, from all liabilities, damages, losses, costs and expenses of whatsoever kind or nature, including, but not limited to, reasonable attorney's fees, reasonable expert witness fees and court costs (all of which are collectively referred to as "Damages") to the extent such Damages are caused by the negligence, recklessness or intentional wrongful conduct of the Contractor and/or persons employed or utilized by the Contractor in the performance of this Agreement.
 - (2) In any and all claims against the Owner or its members, directors, officers, employees, representatives and agents by any employee of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, this indemnification under this Sub-article "g." shall not be

SECTION V.: INSURANCE AND BOND (... Continued)

limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

- (3) In addition to those indemnities previously described, the obligations of the Contractor under this Sub-article "g." shall extend to the liability of the Consultant or Consultants, if any, on this Project, and the Consultant's members, directors, officers, employees, representatives or agents in the same manner as applicable to the Owner. Provided, however, the obligations of the Contractor under this Sub-article "g." shall not extend to the liability of the Consultant, its members, directors, officers, employees, representatives or agents arising out of: 1) the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs or specifications, or 2) the giving of or the failure to give directions or instructions by the Consultant, its members, directors, employees, representatives or agents provided such giving or failure to give is the primary cause of the injury or damage.
 - (4) The remedy provided to the Owner and the Consultant and their respective members, directors, officers, employees, representatives and agents by this indemnification shall be in addition to and not in lieu of any other remedy available under this contract or otherwise. This indemnification obligation shall not be diminished or limited in any way to the total limits of insurance required in this contract or otherwise available to Contractor or any sub-contractor.
 - (5) To the fullest extent permitted by law, the Contractor shall indemnify, defend and hold harmless the Owner its officers, agents, volunteers, and employees from and against all claims, damages, losses, and expenses, including but not limited to all fees and charges of engineer(s), architect(s), attorney(s) and other professional(s), court costs, or other alternative dispute resolution costs arising out of, resulting from, or otherwise but for the performance or furnishing of Proposer's work or services under this Invitation to Bid; provided that any such claim, damage, loss or expense is attributable to bodily injury, sickness, disease, death or personal injury, or property damage, including the loss of use or diminution in value resulting there from; but only to the extent caused in whole or in part by the actual or alleged negligent acts, errors, or omissions of Contractor, Contractor's Subcontractor(s) or anyone directly or indirectly employed or hired by Contractor, or anyone for whose acts Contractor may be liable. The Owner reserves the right, but not the obligation, to participate in defense without relieving Contractor of any obligation hereunder.
- h. Contractor's Pollution Liability
- (1) As evidence of compliance with the insurance required by Paragraph "c.", Subparagraphs 6 (Contractor's Pollution Liability), the Contractor

SECTION V.: INSURANCE AND BOND (... Continued)

shall furnish the Owner with a Certificate of Insurance Compliance (Form 101-87) signed by an authorized representative of the insurer(s) providing the coverage. The Contractor agrees the policy shall include a minimum three (3) year Discovery (tail) reporting period, and a retroactive date that equals or precedes the effective date of the Contract, or the performance if Work hereunder. This coverage can be provided on a Per-Project basis.

2. Surety Bonds.

- a. General. All bonds shall be written through a reputable and responsible Surety bond agency licensed to do business in the State of Florida and with a Surety company or corporation meeting both Subparagraphs (1) and (2) below. All bonds, including bid bonds and contract bonds shall have affixed to them a certified copy of current Power of Attorney of the Attorney-in-Fact who executed the bond on behalf of the Surety. Bond requirements in excess of \$500,000, including bid bonds and contract bonds, shall be written with a Surety company meeting the specifications of both Subparagraphs (1) and (2). In the event the bond requirement does not exceed \$500,000, bonds written with a Surety company meeting either a) the requirements of Subparagraphs (1) and (2) or, alternatively, b) the requirements of Subparagraph (3) shall be acceptable.

- (1) Having a minimum rating in the latest revision of Best's Insurance Reports of:

Contract Amount	Policyholder	Financial
Under \$250,000	B+	Class III
\$250,000.01 to \$2,500,000	B+	Class IV
\$2,500,000.01 to \$5,000,000	A-	Class IV
Over \$5,000,000.01	A	Class V

- (2) Holding a current certificate of authority as acceptable Surety on federal bonds in accordance with U. S. Department of Treasury, Circular 570, current revision. If the amount of the bond exceeds the underwriting limitations set forth in the Circular, in order to qualify, the net retention of the Surety Company shall not exceed the underwriting limitation in the Circular and the excess risk must be protected by co-insurance, reinsurance, or other methods. Further, the Surety Company shall provide the Owner with evidence satisfactory to the Owner that such excess risk has been protected in an acceptable manner.
- (3) In the event the bond requirement does not exceed \$500,000, bonds

SECTION V.: INSURANCE AND BOND (... Continued)

with a Surety Company in compliance with the following requirements shall be acceptable:

- (a) The Surety Company holds a certificate of authority authorizing it to write Surety bonds in Florida.
- (b) The Surety Company has twice the minimum surplus and capital required by the Florida Insurance Code at the time the invitation to bid is issued.
- (c) The Surety Company is otherwise in compliance with the provisions of the Florida Insurance Code.
- (d) The Surety Company holds a currently valid certificate of authority issued by the United States Department of the Treasury under Section 9304 to 9308 of Title 31 of the United States Code.

In order to qualify as an acceptable Surety Company under this Subparagraph (3), a Certificate and Affidavit for Surety Bond Insurer (Form CASBI included in the contract documents) shall be executed by an officer of the Surety bond insurer as evidence that a Surety Company is in compliance with the foregoing requirements and shall be submitted with the bond.

- b. Agent. The name of the agent for the Surety Company shall be listed in the prescribed space on both the bid bond and the contract bond.
- c. Bid Bonds. Refer to "Supplemental Instructions to Bidders," Article 6 "Bid Guaranty." Provisions of this Article apply to bid bonds. Surety's standard bond form for State of Florida is acceptable.
- d. Contract Bonds. The Contractor, at its own expense, shall furnish a Performance Bond, and a Statutory Payment Bond as security for the faithful performance under the contract documents. The bonds shall be in an amount at least equal to the contract price, in the form provided in these contract documents, and with such Surety as is acceptable to the Owner. Such bonds shall indemnify the Owner for damages associated with unexcused late delay of the project.
- e. Additional Bond. It is further mutually agreed between the parties hereto that if, at any time during the contract period, the Surety or Sureties upon the bonds ceases to meet the specified minimum criteria or otherwise become financially unsatisfactory, or if for any reason, such bond ceases to be adequate to cover the performance of the Work, the Contractor shall immediately, and at its expense, furnish an additional bond or replacement bond in such form, amount, and with such Surety or Sureties as shall be satisfactory. In such event, no further payments to the Contractor shall be deemed to be due under this contract until such new or additional security for the faithful performance of the Work shall be furnished in manner and form satisfactory to the Owner.

SPECIAL CONDITIONS

INDEX

ITEM		PAGE NO.
		SC-
1.	Time for Completion	2
2.	Liquidated Damages.....	2
3.	Warranty.....	3
4.	Permits	3
5.	Owner's Minimum Project Work Rules.....	3
6.	Existing Soil Conditions.....	3
7.	Site Conditions.....	3
8.	Structure over Navigable Waters	4
9.	Welding, Burning, and Hot-work Regulations.....	4
10.	Tax Savings Program, General.	5
11.	Progress Photographs.....	8

SPECIAL CONDITIONS

The "General Conditions," Section I through Section V, and the articles of this section shall apply to the Contractor and all Subcontractors. The "Special Conditions" supplement and/or amend the "General Conditions" and other contract documents as necessary for this project. Any article, paragraph, or subparagraph in the "General Conditions" or other contract documents not so supplemented or amended by this section shall remain in effect.

1. Time for Completion

The Contractor shall totally and finally complete all work not later than **183** calendar days after receipt of Notice to Proceed.

2. Liquidated Damages

- a. The parties agree that at the time of entering into this Agreement the parties cannot determine the precise amount of damages that JAXPORT will suffer in the event Contractor is unable to perform its obligations under this Agreement. The parties agree that the damages suffered by JAXPORT under such circumstances are uncertain and difficult to ascertain. Therefore, the parties agree that this sum is fair and reasonable and represents liquidated damages and is not a penalty.
- b. Should the Contractor or, in case of its default, the Surety fail to complete the work within the time stipulated in the contract, or within such extra time as may have been granted by the Owner, the Contractor or, in case of its default, the Surety shall pay to the Owner not as a penalty but as Liquidated Damages the amount so due as determined below.
- c. For each calendar day that any part of the work remains uncompleted after the expiration of the contract time, the sum per day specified below shall be deducted by the Owner from monies due the Contractor, not as a penalty but as agreed Liquidated Damages representing loss to the Owner for additional cost of contract administration, inconvenience and additional cost of operations only due the Owner as a result of the Contractor's late completion. If no money is due the Contractor, the Owner shall have the right to recover said sum or sums from the Contractor, from the Contractor's Surety, or from both. The assessment of Liquidated Damages shall be in addition to actual damages or claims to the Owner except for inconvenience, administrative costs, and additional costs of operation.
- d. Liquidated Damages for failure to complete the work within the time specified for the completion of the work shall be:

\$1,100.00 per calendar day
- e. Permitting the Contractor to continue and to finish the work, or any part of it, after the expiration of the contract time allowed including extensions of time granted to the Contractor shall, in no way, act as a waiver on the part of the Owner, of the Liquidated Damages due under the contract.

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- f. In case of default of the contract and the completion of the work by the Owner, the Contractor and its Surety shall be liable for the Liquidated Damages and delay under the contract, but no Liquidated Damages shall be chargeable for any delay in the final completion of the work by the Owner due to any unreasonable action or delay on the part of the Owner.

3. Warranty

The Contractor agrees to correct or replace any defective materials or workmanship for a period of **One (1) Year** from execution of Certificate of Contract Completion and Contractor's Affidavit to Owner. The Technical Specifications may require a longer warranty period for all or portions of the Work.

4. Permits

The Contractor shall secure permits and licenses as specified in paragraph "f" of the "Contractor's Responsibility" section of the "General Conditions". The Owner will obtain State and Federal permits for permanent construction, and has applied for Federal and State dredge and fill permits and other local permits for this project, if applicable.

The Contractor shall obtain the City Building Permit and any permits required for the construction of temporary structures, and temporary dredging and filling which may be necessary to facilitate its construction scheme and operations.

5. Owner's Minimum Project Work Rules

See FORM PWR

6. Existing Soil Conditions

The Owner has, for its own use, made borings at or near the site of the Work. Any boring data shown in these contract documents is presented only as information which indicates certain conditions found and limited to the exact locations and on the dates indicated. Any interpretations or conclusions drawn by the Contractor from such data shall be its own and the Owner makes no representation or guarantee concerning the accuracy or completeness of such data. The Contractor shall be responsible for making its own determination of subsurface conditions prior to bidding and shall not assume that any of the aforesaid boring data will necessarily be found or maintained.

7. Site Conditions

The Contractor shall visit the location of the Work and make such investigations of existing conditions above or below the surface of the ground as it may deem necessary for the proper and timely performance of its work, including but not limited to field measurements, soil investigations, laydown areas, interferences and general logistics. No oral representations by any persons regarding such

conditions either before or after the execution of this contract, shall affect or modify any of the terms or obligations herein contained.

8. Structure over Navigable Waters

Where structures are erected in, adjacent to, or over navigable waters, the Contractor shall observe all regulations and instructions of Federal and other authorities having control over such waters. The Contractor shall not obstruct navigation channels without permission from the proper authority and shall provide and maintain navigation lights and signals in accordance with the Federal requirements for the protection of the structure, or falsework, and of navigation.

9. Welding, Burning, and Hot-work Regulations

The U. S. Coast Guard requires JAXPORT to maintain "welding and hot-work" permits valid for 3-year periods that allow JAXPORT and its Contractors to complete any such work on its marine terminal docks. The area of the terminal covered by this program extends landward from the face of the wharf 150 feet. Beyond 150 feet is covered by rules and regulations of the Jacksonville Fire Marshal's Office, and does not require permitting.

- a. The Contractor must contact the designated JAXPORT terminal representative who will inspect the project area in accordance with, and issue the JAXPORT Cutting-Welding-Hot-work Authorization Form.
- b. Once JAXPORT representative has issued the Authorization Form, he will give the Contractor a copy of the U. S. Coast Guard permit, which must be posted by the Contractor in the vicinity of the Contractor's project.
- c. After receiving the completed Authorization Form and posting the U. S. Coast Guard permit in the job area, the Contractor must then contact the U. S. Coast Guard Marine Safety Office, Jacksonville, FL, supplying the following information:
 - (1) U. S. Coast Guard Hot-work permit number
 - (2) The types of hot-work to be accomplished
 - (3) The exact location of the hot-work at the facility.
 - (4) Anticipated duration of the hot-work
 - (5) Type and location of any dangerous cargo on the facility.
 - (6) Name/phone number of the point of contact at the facility.
 - (7) The name of the Contractor.
- d. The Marine Safety Office of Jacksonville will issue a reference number allowing the Contractor to use the JAXPORT Welding and Hot-work Permit" for up to a period of 7 days.
- e. Steps a. through d. must be repeated each 7-day period thereafter until the welding and hot-work portions of the contract is complete.

It is the Contractor's responsibility to comply with all federal, state and local laws.

10. Tax Savings Program, General.

Goods and services purchased directly by the Contractor are subject to all State and/or local taxes. All items, materials, supplies and/or equipment incorporated and/or used in the construction of the project and paid for by the Contractor are, consequently, subject to all applicable taxes.

It is the Contractor's sole responsibility to incorporate any and all applicable taxes into the bid proposal including all railroad materials and equipment for this project without regard to the optional purchasing procedures hereinafter defined. JAXPORT is not a Railroad Company or Railroad Operator, therefore the railroad tax exemption rules do not apply to JAXPORT.

JAXPORT Tax Exemption

Chapter 212 of the Florida Statutes, however, provides JAXPORT with an exemption from the payment of sales taxes for all procurements made directly by JAXPORT.

This section contains the specific administrative and/or purchasing procedures that the Contractor shall follow for the purpose of facilitating JAXPORT's procurement of major items to the extent that JAXPORT may so elect and thereby obtain any benefit that may accrue to JAXPORT from the sales tax exemption permitted by the Florida Statutes.

Administrative and/or Purchasing Procedures.

The following procedures are hereby established to permit JAXPORT to purchase in its own name and for its own account some of the items, equipment, materials and supplies which will form part of the work for which the Contractor is obligated to construct under this contract.

Within a period of time that will not adversely impact the orderly progression of the Project, agreed upon by both JAXPORT and Contractor following notice of contract award, the Contractor shall prepare and submit to the Project Manager an itemization of all items, materials, supplies and/or equipment that will be incorporated into this Project for which the Contractor has a firm quotation and as hereinafter specified. If the Contractor does not have a firm quotation for any items at the time the initial list is prepared, the Contractor shall update the previously submitted list immediately upon obtaining the necessary quotation.

This list shall include all items identified on the plans or in the "Products" section of each Technical Specification that individually or collectively cost \$10,000 or more and would normally be ordered from one supplier under a single Purchase Order. Items that are purchased on an "as needed" basis over time under multiple Purchase Orders, each of which are less than \$10,000, may be excluded from this list even though the aggregate total cost of all items in this category exceeds the \$10,000 minimum.

- a) The list must contain the following:

-
1. A description of item, material, supplies and/or equipment to be procured. This description shall be by common name and be referenced to the technical specification and CSI code under which it is defined.
 2. The quantity of the item, material, supplies and/or equipment to be procured, the unit cost applicable to each, and the appropriate State of Florida and local (Duval County) sales tax rate in which the procurement is delivered.
- b) Within five (5) working days following receipt of the proposed purchasing list or supplemental firm quotation from the Contractor, the Project Manager will notify Contractor of JAXPORT's decision as to which items will be purchased directly by JAXPORT.
- c) Purchase Orders for the selected items will be requested from the Purchasing Department using the Contractor's Letter of Quotation to identify the Vendor name, Contractor, and Not to Exceed amount of Purchase Order. Each Purchase Order will be assigned a number based on the project number and sequence number of Purchase Orders issued.

It shall be understood by the Contractor that these Purchase Order Forms will be issued for the sole and specific purpose of procuring the selected items for incorporation in the Work for which the Contractor is obligated to construct under this contract.

- d) Purchase Orders issued with Letter of Quotation attached, will be forwarded by Project Manager to Contractor with request to complete Purchase Order as to item(s) ordered, delivery instructions, and signature of Contractor.

The Purchase Order, however, shall omit any Florida State or local sales tax. In lieu thereof, JAXPORT's Consumer's Certificate of Exemption No. 85-8012543323C-8 shall be attached to the Purchase Order prior to distribution.

Each Purchase Order shall be completed and countersigned by the Contractor. The Contractor shall be responsible for assuring that the requirements for the procurement, as detailed on the plans and in the Technical Specifications, are satisfied.

- e) Contractor will then return the completed Purchase Order(s) to JAXPORT for countersignature by the Project Manager approving purchase as to conformity to specifications; and to the Purchasing Department for countersignature by the Purchasing Manager.
- f) After obtaining all signatures, the Project Manager shall simultaneously distribute the original to the Vendor or supplier with copies to the Purchasing Department, the Contractor, and the Finance Department.
- g) The Contractor and Owner agree that it is to their mutual benefit that prosecution of the Work proceed with due diligence and without interruption. Vendors of selected items shall therefore make deliveries as directed by the Contractor, when needed, to enable the Contractor to perform his scheduled obligations.

-
- h) JAXPORT and Contractor agree that the Contractor will receive, receipt for, inspect, accept and to the extent necessary, unload, store, and protect the selected items at either the jobsite or other place as the Contractor may deem appropriate until brought to the worksite by the Contractor.

The Contractor shall accept delivery of selected items from the appropriate Vendor as conforming to both the terms and conditions of the Purchase Order and applicable Technical Specifications.

- i) Upon receipt of an invoice for selected items delivered, the Contractor will write on the face of the invoice that it is "okay for payment", sign, and date invoice. The invoice is then submitted in E-Builder to JAXPORT's Project Manager for authorization for payment.
- j) Upon receipt of a properly approved invoice, JAXPORT shall pay the Vendor of the selected items the amount due as defined by the Purchase Order but without any Florida State or local sales tax.

Where the Contractor has special terms with a Vendor to receive a discount if paid within a 10, 30 days' time and if the invoice is received within that time frame, invoices will be processed and the discount taken of which JAXPORT will receive the benefit. The Contractor will be advised by mail when an invoice is forwarded to the Finance Department for payment and the amount to be paid, showing discounts taken by JAXPORT, if any. Otherwise, invoices will be paid within 30 days from date on invoice.

- k) In preparation of its Monthly Progress Payment request, the Contractor shall show on Line 3 of the Application for Payment the total amount of purchase orders issued under this Tax Savings Program. On Line 4 of the Application for Payment, the Contractor will show the amount of tax savings. Line 5 of the Application is the total of Lines 3 and 4.
- l) An adjustment shall be summarized by reporting at the end of the contract and a Change Order to the contract will be made to close out any remaining balances on purchase orders based on the total of payments against each purchase order made for selected items, plus the total sales tax computed. A final reconciliation change order will be issued on all tax savings purchase orders remaining balances based on payments plus sales tax.
- m) Notwithstanding JAXPORT's payment for selected items, as provided for above, the Contractor assumes full responsibility for any change in price and liability associated with selecting and ordering the proper quantity and type of materials and equipment for scheduling the appropriate delivery date, selection of the appropriate Vendor or supplier, the correctness of the Purchase Order and receipt report and the storage, delivery, and protection of the equipment and/or material.
- n) The Contractor shall use Owner approved Purchase Orders only for purchasing goods, equipment, materials and supplies previously designated or selected by JAXPORT. The Contractor shall immediately notify and consult with JAXPORT relative to any change or modification to any previously approved selected

item(s). The Contractor shall account for every Purchase Order including those voided for any reason, and shall return all voided and unused Purchase Order Forms prior to the final contract payment.

- o) If the Contractor enters into one or more subcontracts with respect to any portion of the Work, the Contractor will require that each subcontractor allow, under the terms of their respective subcontracts, JAXPORT to purchase selected item(s) in the same manner as provided above with respect to the Contractor.

The Contractor shall sign all Purchase Orders for selected item(s) required by the subcontractor to complete the portion of the Work required by the subcontract.

11. Progress Photographs

Monthly Applications for Payment (see Article 16 of the "General Conditions") shall be accompanied by not less than 5 color photographs, approximately 3 inches by 5 inches in size showing current status of various areas and components of the Project. Photographs are to be mounted in report form with descriptive captions, and sequentially numbered and uploaded in E-Builder as an attachment to each AFP. The Progress Photograph Report shall contain the following certification on its front cover which requires signature of the Contractor's responsible official.

<p>THIS IS TO CERTIFY THAT THE ATTACHED PHOTOGRAPHS ACCURATELY REPRESENT THE ACTUAL STATUS AND CONDITION ON <u> [DATE] </u> OF THE <u> [CONTRACT TITLE] </u> BEING CONSTRUCTED FOR THE JACKSONVILLE PORT AUTHORITY UNDER CONTRACT NO. <u> [CONTRACT NO.] </u>.</p> <p>FIRM: _____</p> <p>SIGNATURE: _____</p> <p>NAME TYPED: _____</p> <p>TITLE: _____</p> <p>DATE: _____</p>

REQUIRED LIMITS OF INSURANCE

Prior to commencing Work, Contractor shall furnish Owner with Certificates of Insurance (COI), and copies of required Endorsements and Forms, executed by a duly authorized representative of each insurer, showing compliance with the insurance requirements set forth below.

Additional Insured Endorsement must be submitted with COI document.

Owner shall be included as an additional insured under the Commercial General Liability policy for on-going and completed operations.

Primary & Non-Contributory Endorsement must be submitted with COI document.

Contractors CGL coverage must be Primary and Non-Contributory.

Waiver of Subrogation is required for Workers Compensation, CGL, and Auto Liability.

Waiver of Subrogation Form must be submitted with COI document.

1. WORKERS' COMPENSATION/EMPLOYERS' LIABILITY

Part One - There shall be no maximum limit (other than as limited by the applicable statute) for liability imposed by the Florida Workers' Compensation Act, or any other coverage required by the contract documents, which are customarily insured under Part One of the standard Workers' Compensation Policy.

Part Two - The minimum amount of coverage required by the contract documents which are customarily insured under Part Two of the standard Workers' Compensation Policy shall be:

- \$1,000,000 (Each Accident)
- \$1,000,000 (Disease-Policy Limit)
- \$1,000,000 (Disease-Each Employee)

2. COMMERCIAL GENERAL LIABILITY

Commercial General Liability Policy with the following minimum limits:

General Aggregate	\$2,000,000
Products Completed & On-going Operations Aggregate	\$1,000,000
Personal and Advertising Injury, Each Occurrence	\$1,000,000
Bodily injury and Property Damage (each occurrence)	\$1,000,000

3. BUSINESS AUTO POLICY

Limit no less than \$1,000,000 per accident for bodily injury and property damage. Maximum deductible or self-insured retention in an amount not exceeding \$10,000. Any deductible or self-insurance retention should be indicated on the Bidder's COI document.

Covering any auto (code 1);

If no owned autos, hired (Code 8) and Non-owned autos (Code 9)

Failure of Contractor to maintain the required insurance shall constitute a default under this Agreement and, at Owner's option, shall allow Owner to terminate this Agreement.

4. UMBRELLA LIABILITY

\$3,000,000 per Occurrence; \$3,000,000 Aggregate

Minimum underlying coverages shall include Commercial General Liability, Automobile liability and Contractors Pollution Liability.

5. PROPERTY INSURANCE / BUILDER' RISK

If this contract includes construction of or additions to above ground buildings or structures, Contractor shall provide Builder's Risk insurance written on 'All-Risk' coverage form with the minimum amount of insurance to be 100 percent of the completed value of such building(s), structure(s) or addition(s).

If the contract does not include construction of above ground buildings, structures or additions but does involve the installation of machinery or equipment, Contractor shall provide an Installation Floater with the minimum amount of insurance to be 100 percent of the completed value of such installed machinery of equipment.

6. CONTRACTOR LIABILITY

Contractor shall obtain Contractors Liability coverage for property damage to such building(s), structure(s) or addition(s) with applicable sub-limits, or equivalent policy form with the minimum amount of insurance to be 100 percent of the completed value of such building(s), structure(s) or addition(s).

Contractor shall maintain such Contractor Liability insurance from the inception of its services, and until at least three (3) years after completion of all services required under this Agreement.

Prior to commencement of services, the Proposer / Consultant shall provide to JPA a certificate or certificates of insurance, signed by an authorized representative of the insurer(s) evidencing the insurance coverage specified in the foregoing Articles and Sections. The required certificates shall not only name the types of policies provided, but shall also refer specifically to this Agreement and Article, and to the above paragraphs in accordance with which insurance is being furnished, and shall state that such insurance is provided as required by such paragraphs of this Agreement.

Cross-Liability Coverage: If Contractor's liability policies do not contain the standard ISO separation of insured's provision, or a substantially similar clause, they shall be endorsed to provide cross-liability coverage.

Sub-Contractor's Insurance: Contractor shall cause each subcontractor employed by Contractor to purchase and maintain insurance of the type specified in this agreement. When requested by Owner, Contractor shall furnish to Owner copies of certificates of insurance evidencing coverage for each subcontractor.

Failure of Contractor to maintain the required insurance shall constitute a default under this Agreement and, at Owner's option, shall allow Owner to terminate this Agreement.

Failure of Owner to demand such certificate or other evidence of full compliance with these insurance requirements, or failure of Owner to identify a deficiency from evidence that is provided, shall not be construed as a waiver of Contractor's obligation to maintain such insurance.

No Representation of Coverage Adequacy: By requiring the insurance as set out in this Agreement, Owner does not represent that coverage and limits will necessarily be adequate to protect Contractor, and such coverage and limits shall not be deemed as a limitation on Contractor's liability under the indemnities provided to Owner in this Subcontract.

If the Contractor/Consultant maintains broader coverage and/or higher limits than the minimums shown above, the Owner requires and shall be entitled to the broader coverage and/or the higher limits maintained by the contractor/consultant. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the Owner.

CERTIFICATE OF INSURANCE COMPLIANCE

ADDRESSEE

**Jacksonville Port Authority
 Post Office Box 3005
 Jacksonville, FL 32206-0005
 Attn: Engineering Services
 Contract Specialist**

NAME INSURED

Name and Address of Insured:

By executing this Certificate of Insurance Compliance, the undersigned warrants to the addressee that: (1) the undersigned is an authorized representative of the insurers identified in the certificate, (2) the policies or binders described in the certificate have been issued to the above named insured and are in force at this time, (3) the policies or binders as issued provide coverage in full compliance with the insurance requirements contained in the contract documents for the above referenced project with the minimum limits of coverage as specified in the Required Limits of Insurance (Form 100-87) and the contract documents, and (4) the policies or binders will not be changed, cancelled, non-renewed, or renewed with more restrictive terms and conditions so as to affect this certificate until at least forty-five (45) days after written notice of such change, cancellation or nonrenewal has been received by the addressee.

DESCRIPTION OF INSURANCE POLICIES SUBJECT TO THIS CERTIFICATE

Complete the following section for each of those coverages for which the undersigned is making the above warranty. The sum of the limits shown for the primary and excess insurers must equal or exceed the minimum limits required by the contract.

Employer's Liability/Workers' Compensation Limits	Primary Issuer ID: _____	First Excess ID: _____	Second Excess ID: _____
Part One	\$	\$	\$
Part Two (Each Accident)	\$	\$	\$
Disease-Policy Limit			
Disease-Each Employee	\$	\$	\$

Longshoremen's and Harbor Workers' Compensation	Primary Issuer ID: _____	First Excess ID: _____	Second Excess ID: _____
	\$	\$	\$

Commercial General Liability Limits	Primary Issuer ID: _____	First Excess ID: _____	Second Excess ID: _____
General Aggregate	\$ _____	\$ _____	\$ _____
Products/Completed Operation Aggregate	\$ _____	\$ _____	\$ _____
Personal and Advertising Injury, Each Occurrence	\$ _____	\$ _____	\$ _____
Body injury and property damage	\$ _____	\$ _____	\$ _____
Fire damage (any one fire)	\$ _____	\$ _____	\$ _____
Medical expense (any one person)	\$ _____	\$ _____	\$ _____

Business Auto Liability Limits	Primary Issuer ID: _____	First Excess ID: _____	Second Excess ID: _____
Each Occurrence	\$ _____	\$ _____	\$ _____
Annual Aggregate	\$ _____	\$ _____	\$ _____

Protection for Owner's Liability Limits	Primary Issuer ID: _____	First Excess ID: _____	Second Excess ID: _____
Each Occurrence			
Annual Aggregate			
Or Commercial General Liability Coverage Contains the Described Additional Insured Endorsement YES____ NO____			

Property Insurance Risk	Primary Issuer ID: _____	First Excess ID: _____	Second Excess ID: _____
Builder's Risk			
Installation Floaters			
Railroad Protective Liability Coverage			

POLICY AND INSURER INFORMATION

ID	Name of Insurer	Policy Number	Expiration Date	Best's Rating	Authorized in Florida (Y/N)?

Authorized Representative's Name: _____
(Print and then sign)

Date: _____

Name of Insurance Company: _____

Address of Insurance Company: _____

JACKSONVILLE PORT AUTHORITY

SUMMARY AND CERTIFICATION
APPLICATION FOR PAYMENT NO.

PROJECT NAME: BMT EQUIPMENT WASH FACILITY
PROJECT LOCATION: BLOUNT ISLAND MARINE TERMINAL
JPA CONTRACT NO: C-1965
CONTRACTOR:
APPLICATION PERIOD: _____ TO: _____

DATE:
A/E PROJECT NO.:

1. ORIGINAL CONTRACT SUM.....	\$ _____
2. MODIFICATION BY CHANGE ORDERS	\$ _____
3. LESS: Purchase Orders issued by JPA for material selected for tax savings.....	\$ _____
4. LESS: State and Local Tax savings on material purchase orders.....	\$ _____
5. LESS: TOTAL PURCHASE ORDERS & TAX SAVINGS..... (Line 3 plus Line 4)	\$ _____
6. CURRENT CONTRACT VALUE.....	\$ _____
7. TOTAL COMPLETED & STORED TO DATE.....	\$ _____
8. RETAINAGE WITHHELD: _____ % of Completed Work _____ % of line 7).....	\$ _____
10. TOTAL EARNED LESS RETAINAGE WITHHELD.....	\$ _____
11. LESS PREVIOUS PAYMENTS RECEIVED.....	\$ _____
12. AMOUNT DUE THIS PAYMENT.....	\$ _____

SUMMARY OF APPROVED CHANGE ORDERS			SUMMARY TAX SAVING'S PURCHASE ORDERS			CONTRACTOR'S CERTIFICATION
No.	Date Appd.	Value (+/-)	No.	Date Appd.	Value (+/-)	
TOTALS: \$ _____			TOTALS: \$ _____			The undersigned CONTRACTOR certifies that: (1) all items and amounts shown above are correct; (2) all Work performed and materials supplied fully comply with the terms and conditions of the Contract Documents; (3) all previous progress payments received from JAXPORT on account of Work done under the Contract referred to above have been applied to discharge in full all obligations of CONTRACTOR incurred in connection with Work covered by prior Applications for Payment; (4) title to all materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to JAXPORT at time of payment free and clear of all liens, claims, security interests and encumbrances; and (5) if applicable, the CONTRACTOR has complied with all provisions of Article V of the Specification documents including the payment of a pro-rata share to JSEB, MBE, WBE, DBE and/or SBA Firms of all payments previously received by the CONTRACTOR. State of Florida, County of Duval Subscribed and sworn to before me this _____ day of _____ 20____ - By: _____ Title: _____ Date: _____ who is/are personally known to me or has/have produced _____ (type of identification) as identification. Notary Signature: _____ Commission No.: _____ (Name of Notary typed, Printed or Stamped) My Commission Expires: _____ -(SEAL ABOVE)
=====			=====			

BY THE OWNER'S CONSULTANT

I hereby certify that, to the best of my knowledge, and belief, based in part on actual site observations, the Contractor has satisfactorily completed the work represented in this Application for Payment in accordance with requirements of the contract documents, and payment of the current amount due to the Contractor is recommended.

Firm: _____

By: _____

Title: Date: _____

JPA APPROVAL FOR PAYMENT

By: _____

Date: _____

Project Acct.: _____



C-1965 Request for Information

Date Created: _____

Answer Company	Answer By	Author Company	Authored By
-----------------------	------------------	-----------------------	--------------------

Co-Respondent	Author RFI Number
----------------------	--------------------------

Subject	Discipline	Category
----------------	-------------------	-----------------

Question	Date Required
-----------------	----------------------

Submitted By: _____ **Date:** _____

Suggestion

Answer	Date Answered:
---------------	-----------------------

Submitted By: _____ **Date:** _____

AGREEMENT BETWEEN OWNER AND CONTRACTOR

This Agreement is entered into as of this ____ day of _____, 20__ by and between:

The OWNER:

**Jacksonville Port Authority
2831 Talleyrand Avenue
Post Office Box 3005
Jacksonville, FL 32206-0005
(904) 357-3058**

ATTN: Procurement Services

And the CONTRACTOR:

**Awarded Contractor Name
Awarded Contractor Address
Awarded Contractor Phone
Number
Insert Vendor Number**

For the following WORK:

**Contract No.: C-1965
Project No.: B2023-04
BIMT EQUIPMENT WASH FACILITY
BLOUNT ISLAND MARINE TERMINAL**

Designed by CONSULTANT:

Jacob Engineering

The OWNER and CONTRACTOR agree as set forth below:

ARTICLE 1. SCOPE OF WORK

The Contractor agrees to furnish all materials, equipment, supervision and perform all labor and services for Contract No. **C-1965** as shown on the contract drawings and described in the project specifications, each document of which is incorporated herein by reference and listed under Article 2 hereof.

ARTICLE 2. CONTRACT DOCUMENTS

The contract documents, which constitute the entire Agreement between the Owner and the Contractor, are enumerated below and all are as fully a part of the contract as if attached to this Agreement Form or repeated herein.

1. Agreement between Owner and Contractor.
2. Exhibits and Attachments to this Agreement.
3. Contractor's Bid, Performance Bond, and Statutory Payment Bond.
4. Contractor's Bid Form.
5. Invitation to Bidders.
6. Supplementals Instruction to Bidders.
7. Conflict of Interest Certificate.
8. General Conditions of the contract.
9. Supplementary Conditions of the contract.
10. Special Conditions of the contract.
11. Technical Specifications.
12. Drawings entitled: _____
13. Addenda Nos. _____ through _____, inclusive.
14. Change Orders, duly authorized and delivered after execution of this Agreement.
15. Notice of Award.
16. Notice to Proceed.
17. Certificate of Contract Completion and Contractors Affidavit to Owner.
18. Certificate of Substantial Completion.
19. Approved Contractor's Construction Schedule for the Work.
20. Contractor's Schedule of Values for the Work.
21. Contractor's Request for Information Form.
22. Owner's Minimum Project Work Rules.
23. Required Limits of Insurance.
24. Certificate of Insurance Compliance.
25. Application for Payment Forms.
26. Form of Consent of Surety Company to Final Payment.
27. SEB Participation Goal – **100% Set Aside** (JSEB/MBE/WBE/DBE/SBA)

ARTICLE 3. CONTRACT TIME

1. Contract Time. Time is of the essence for all Work in this contract. The Contractor shall totally and finally complete the Work within **183** calendar days from Notice to Proceed date.
2. Liquidated Damages. Refer to "Special Conditions", Item 2.

ARTICLE 4. CONTRACT SUM

For the performance of the Work and in accordance with the terms of the contract documents, the Owner will pay to the Contractor, subject to additions and deductions by Change Order, the Contract Sum of:

\$ _____

ARTICLE 5. PROGRESS PAYMENTS

See "General Conditions", Section IV.3.a.

ARTICLE 6. FINAL PAYMENT

The Owner shall cause to be paid, to the Contractor, a final payment constituting the entire unpaid balance of the Contract Sum, when the Work has been completed, the Contract and closeout procedures are fully performed, and the Project Manager has reviewed and approved the final application.

ARTICLE 7. MISCELLANEOUS PROVISIONS

1. Terms. Terms used in this Agreement which are defined in the Conditions of the contract shall have the meaning designated therein.
2. Contract Bonds. The Contractor shall furnish a Performance Bond, and Statutory Payment Bond for 100 percent of the Contract Sum as security for the faithful performance and payment of all obligations under the contract documents.
3. Indemnity. In addition to the indemnity provisions of General Conditions Section V.1.g., the Contractor shall hold harmless, indemnify and defend the JPA, its board of directors, officers, employees, representatives and agents against any claim, action, loss, damage, injury, liability, cost and expense of whatsoever kind or nature, including but not limited to attorney's fees and court costs arising out of any injury, whether mental or corporeal, to persons, including death, or damage to property to the extent caused by the negligence, recklessness or intentional wrongful misconduct of the Contractor, its employees, representatives, or any one acting on the Contractor's behalf in the performance of this contract, or any claim or damage or claim damage related to alleged breach of contract.
4. Access to Documents. The Owner shall be provided daily reports in possession of the Contractor. Owner shall also have access to any other documents related to the project, upon reasonable notice.
5. Subcontracting or Assigning of Contract. The Contractor agrees that it shall not

subcontract, assign, delegate, or otherwise dispose of the contract, the duties to be performed under the contract, or the monies to become due under the contract without the Owner's prior written consent.

IN WITNESS WHEREOF, the parties hereto have duly executed this Agreement as of the day and year first above written.

OWNER

CONTRACTOR

JACKSONVILLE PORT AUTHORITY

BY: _____

BY: _____

TITLE: _____

TITLE: _____

ATTEST:

ATTEST:

**CERTIFICATE OF CONTRACT COMPLETION
AND CONTRACTOR'S AFFIDAVIT TO OWNER**

CONTRACT: **C-1965**

STATE OF ()

COUNTY OF ()

Before me, the undersigned authority,

Personally appeared _____, who being by me

First duly sworn, depose(s) and say(s):

1. He is (they are) _____, (a corporation)
(a partnership) (an individual) doing business as
_____, hereinafter called "Contractor".

2. Contractor heretofore entered into a contract with the Jacksonville Port Authority, hereinafter called "Owner", to furnish material, labor, and services for the construction of a certain building; or repairs or alterations as more specifically described in said contract, on the land and property of the Owner, located at _____, Duval County, Florida.

3. Contractor has fully completed construction in accordance with the terms of the contract and all creditors have been paid in full, except:

<u>Name of Creditor</u>	<u>Amount Due and Unpaid</u>
_____	\$ _____
_____	\$ _____

4. All Workers' Compensation claims have been settled and no liability claims are pending in connection with, arising out of or resulting from, the contract.

5. Receipt by the Contractor of the final payment, under the aforementioned contract, shall constitute a full release and discharge by the Contractor to the Owner of any and all claims of the Contractor against the Owner arising out of, connected with, or resulting from performance of the obligations of the Contractor pursuant to the contract documents.

6. The term "Creditor" as used in this Affidavit means subcontractors, laborers, material men, architects, engineers, landscape architects, surveyors, and all other persons, firms, corporations and activities supplying, performing, or otherwise providing anything of value used for or in connection with the contract.

7. This Affidavit is given pursuant to the provisions of the contract and applicable law, if any. Signed and Sealed in the presence of:

Sworn to and subscribed before me this _____ day _____, 20__.

Notary Public, State of _____
My Commission Expires: _____

**CERTIFICATE OF
SUBSTANTIAL
COMPLETION**

Distribution to:
OWNER
ENGINEER
CONTRACTOR
FIELD
OTHER

**PROJECT: BIMT EQUIPMENT WASH FACILITY
BLOUNT ISLAND MARINE TERMINAL**

**ENGINEER:
ARCHITECT'S PROJECT NO.:**

**PROJECT NO.: B2023-04
CONTRACT NO.: C-1965**

TENANT:

TO (Owner):

**JACKSONVILLE PORT AUTHORITY
POST OFFICE BOX 3005
JACKSONVILLE, FL 32206-0005

ATTN: ENGINEERING SERVICES**

**CONTRACTOR:
CONTRACTOR FOR:**

DATE OF ISSUANCE:

CONTRACT DATE:

PROJECT OR DESIGNATED PORTION SHALL INCLUDE:

The Work performed under this Contract has been reviewed and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above is hereby established as _____, 20 which is also the date of commencement of applicable warranties required by the Contract Documents, except at stated below.

DEFINITION OF DATE OF SUBSTANTIAL COMPLETION

The Date of Substantial Completion of the Work or designated portion thereof is the Date certified by the Engineer when construction is sufficiently complete, in accordance with the Contract Documents, so the Owner can occupy or utilize the Work or designated portion thereof for the use for which it is intended, as expressed in the Contract Documents.

A list of items to be completed or corrected, prepared by the Contractor and verified and amended by the Engineer, is attached hereto. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. The date of commencement of warranties for items on the attached list will be the date of final payment unless otherwise agreed to in writing. Attached Punch List prepared by _____ dated _____.

ENGINEER BY _____ DATE _____

The Contractor will complete or correct the Work on the list of items attached hereto within (_____ **calendar**) days from the Date of Substantial Completion.

CONTRACTOR BY _____ DATE _____

The Tenant accepts the Work or designated portion thereof as substantially complete and will assume full possession thereof at _____ (time) _____ (date).

TENANT BY _____ DATE _____

The Owner accepts the Work or designated portion thereof as substantially complete and will assume full possession thereof at _____ (time) _____ (date).

Jacksonville Port Authority
OWNER BY _____ DATE _____

**CONSENT OF
SURETY COMPANY
TO FINAL PAYMENT**

OWNER
ENGINEER
CONTRACTOR
FIELD
OTHER

PROJECT: BIMT Equipment Wash Facility
Blount Island Marine Terminal

PROJECT NO.: B2023-04

TO (Owner)

CONTRACT NO.: C-1965

JACKSONVILLE PORT AUTHORITY
POST OFFICE BOX 3005
JACKSONVILLE, FL 32206-0005

ARCHITECT'S PROJECT NO.

CONTRACT FOR:

ATTN: ENGINEERING SERVICES

CONTRACT DATE:

CONTRACTOR:

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the
(here insert name and address of Surety Company)

SURETY COMPANY,

On bond of (here insert name and address of Contractor)

CONTRACTOR,

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not
relieve the Surety Company of any of its obligations to (here insert name and address of Owner)

OWNER,

as set for in the said Surety Company's bond.

IN WITNESS WHEREOF,

The Surety Company has hereunto set its hand this _____ day of _____ 20__

Surety Company

Signature of Authorized Representative

Attest:
(Seal):

Title

OWNER'S MINIMUM PROJECT WORK RULES

Project Name: **BIMT EQUIPMENT WASH FACILITY**

Location: **BLOUNT ISLAND MARINE TERMINAL**

Contract No(s): **C-1965**

1. Normal project working hours are as follows:

8:00 A.M.	Starting Time
12:00 Noon - 1:00 P.M.	Lunch
5:00 P.M.	Shift Ends

Other working hours and shift work will be considered by the Owner upon submission by the Contractor.

2. No employee will enter Port Authority operating areas without a specific work assignment.
3. Personal vehicles will be parked in the area(s) specified for construction personnel.
4. No personal vehicles will be permitted inside the security gate controlled area without the written permission of the Terminal Director.
5. Contractor shall provide its employees with a designated eating, drinking area subject to approval of the Project Manager. Cleanliness will be maintained in all areas at all times. The parking lot is not an authorized eating area.
6. The following is a list of violations which are considered unsatisfactory conduct on JAXPORT property and can result in the employee being denied access to the jobsite.
 - a. Refusal to submit to security inspection.
 - b. Smoking in prohibited areas.
 - c. Possession and/or use of intoxicants on JAXPORT property.
 - d. Possession and/or use of narcotics or controlled substance on JAXPORT property.
 - e. Possession of firearms on JAXPORT property.
 - f. Contact with any new vehicles on JAXPORT property.
7. Owner's facilities (such as, but not limited to, elevators, washrooms, vending machines, lunch rooms, etc.) are not to be used by Contractor's employees.
8. Employees shall be provided with visible means of identification, showing Contractor's identification. Employees are required to wear this identification where plainly visible.
9. The Contractor will be responsible for all its employees, suppliers, vendors, and all others on-site providing services to the Contractor.

-
10. All vehicles, persons, packages, lunch pails, and tool boxes entering or leaving JAXPORT property are subject to security inspection.
 11. All vehicles on-site for the Contractor's use must have company identification clearly visible at a minimum distance of 100 feet.

EMPLOYEE SIGNATURE: _____

EMPLOYEE NAME: _____

NAME OF CONTRACTOR: _____

DATE: _____

OWNERS SAFETY GUIDELINES

Project Name: **BIMT EQUIPMENT WASH FACILITY**

Location: **BLOUNT ISLAND MARINE TERMINAL**

Contract No(s): **C-1965**

The safety items listed below is not intended as an exhaustive list of safety requirements but serves as a general guideline.

Safety Manual

The contractor is responsible to provide JAXPORT with an electronic copy of their jobsite specific safety manual that provides safety guidance on day to day work activities to reduce potential safety incidents at the jobsite.

Regulatory Requirements

The contractor and subcontractors will be responsible to:

- Comply with OSHA 29 CFR parts 1917 marine terminals, 1926 construction, 1910 general, 1926.59 hazardous communication standards "right-to-know".
- Post Material safety data sheets (MSDS) in work locations where contractor uses, or stores hazardous chemicals or substances as required by law.
- Contractor and subcontractor will comply with all environmental protection laws and regulations applicable to the jobsite, including those relating to the use of water, the release, discharge or disposal of wastes, the control of drainage, and the protection of vegetation, wildlife, habitats, or surroundings. Contractor and subcontractor shall also observe and comply with any environmental requirements made by JAXPORT in securing any permit or authorization for the jobsite.
- Communicate and wear OSHA required personal protective equipment when on the job site (i.e. reflective vests with Company's identification, gloves, hard hats, safety glasses, steel toe shoes, etc.).
- If applicable ensure that platforms and scaffolding conform to OSHA specifications and have decking, toe boards, mid and top rail, cross bracing, level pads and/or wheels and appropriate ladders for platform access. Ensure the use of continuous fall protection equipment (scaffolds and/or harnesses) when activities take place more than 6'-0" above a lower level or at such lower elevations as may be established for the work site.
- If it becomes necessary to have access to any openings or shafts or to remove handrails, contractor and or subcontractor shall ensure that the openings or shafts are protected in accordance with generally accepted practices and any applicable federal, state or local safety standards while the work is in progress, and that any covers or handrails previously removed by the contractor and or subcontractor are replaced before leaving the area.

OWNERS SAFETY GUIDELINES

Jobsite Requirement

- Contractor will provide safety barriers to clearly identify the working area to prevent others from accessing the work area. The safety zone shall be sufficiently sized to prevent damage to others or existing facilities and structures. Upon completion of the work, Contractor shall remove the safety barriers from the work area.
- Maintain clean work areas and secure and protect all work materials in accordance with safety requirements of generally recognized industry standards.
- Additional safety rules and/or measures may become necessary at any time due to near misses, change in jobsite location, etc.
- Familiarize and abide by JAXPORT safety rules for the jobsite.
- Communicate frequency of safety meeting with its employees and list the topics discussed with signatures of attendees. Such list shall be made available to JAXPORT upon request.
- Perform self-audits (safety assessments) at least monthly and document and provide findings to JAXPORT project management and Risk and Compliance manager upon request.

Incident/Emergency Response Plan

- As soon as possible, but no longer than 2 hrs. after the time of incident, advise JAXPORT of any incident resulting in injury or damage to any property. A written report of the incident will be submitted to the supervising JAXPORT Project Manager and JAXPORT's Manager of Risk and Compliance (904) 357-3083 within 24 hours. Daily updates will be provided to JAXPORT until an investigation is completed.
- Provide JAXPORT on-site management with an "emergency list" showing contractor's preferred company doctor, hospital, workers' compensation insurance company, and any other health care providers, such list to be updated within 24 hours of any change in the information provided. Contractor shall furnish its employees with first aid or refer employees with first aid injuries to its company doctor.

Audit and Training

- Contractor is responsible to train, manage, supervise, monitor, and inspect contractors and subcontracted jobsite work activities enforcing compliance with all applicable federal, state, local laws and JAXPORT safety rules and requirements.
- Documentation of required training must be readily available and in compliance with OSHA requirements.
- JAXPORT personnel may audit contractors and subcontractor's safety processes/programs at the jobsite at any time and empowered to take necessary corrective action up to and including work stoppage for serious safety hazards.

OWNERS SAFETY GUIDELINES

EMPLOYEE SIGNATURE: _____

EMPLOYEE NAME: _____

NAME OF CONTRACTOR: _____

DATE: _____

PERFORMANCE BOND

BOND NO.: _____

As to the Contractor/Principal:

Name: _____

Principal Business Address: _____

Telephone: _____

As to the Surety:

Name: _____

Principal Business Address: _____

Telephone: _____

As to the Owner of the Property/Contracting Public Entity:

Name: _____

Principal Business Address: _____

Telephone: _____

Description of project including address and description of improvements:

Contractor and Surety are each held and firmly bound unto the Jacksonville Port Authority, a body politic and corporate in Duval County, Florida, as Obligee (hereinafter called "JPA"), in the amount of _____ DOLLARS (\$ _____), lawful money of the United States of America, for the payment whereof Contractor and Surety bind themselves, their respective heirs, executors, administrators, legal representatives, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written agreement dated the _____ day of _____, 20____, entered into a contract with the JPA for **BIMT EQUIPMENT WASH FACILITY, BLOUNT ISLAND MARINE TERMINAL** all of said work to be done in strict accordance with any advertisement for bids for said work and done in strict compliance with the drawings and specifications for said work and requirements of the JPA proposal and award therefore and of the contract and all documents included as a part of the contract (hereinafter referred to collectively as the "Contract"), all of which are by reference made a part hereof to the same extent as if fully set out herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall: (1) Promptly and faithfully perform said Contract; and (2) perform the guarantee of all work and materials furnished under the Contract for the time specified in the Contract; and (3) pay the JPA all losses (including delay and disruption damages), expenses and costs, that the JPA sustains because of a default by Contractor under the Contract; then this obligation shall be null and void; otherwise it shall remain in full force and effect.

PROVIDED that, the Surety hereby waives notice of any alteration or extension of time made by the JPA, and any changes in or under the Contract and compliance or noncompliance with any formalities connected with the Contract or the changes shall not affect Surety's obligation under this bond.

PROVIDED further that, whenever Contractor shall be, and declared by the JPA to be in default under the Contract, the JPA having performed the JPA's obligations hereunder, the Surety shall, at the JPA's sole option, either:

(1) Within fourteen (14) days of notice of elected option by the JPA, remedy the default and pay the JPA all losses, actual damages (including delay and disruption damages), expenses, costs, and statutory attorney's fees, including appellate proceedings, pursuant to Section 627.756, Florida Statutes, that the JPA sustains because of a default by Contractor under the Contract and will save the JPA harmless on account of all claims and damages to persons, property or premises arising from delay in meeting either milestone dates or the Contract completion date; or

(2) Award a bid contract with a completion contractor and issue notice to proceed within twenty-one (21) days of notice by the JPA to the Surety of the default of Contractor and demand by the JPA for Surety to complete the Contract. Surety shall obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible qualified bidder, or, if the JPA elects, upon determination by the JPA and the Surety jointly of the lowest bidder and the JPA, and make available as Work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the responsible qualified bidder, arrange for a contract between such balance of the contract price, including other

losses, actual damages (including delay and disruption damages), expenses, costs and statutory attorney's fees, including appellate proceedings, pursuant to Section 627.756, Florida Statutes, for which the Surety may be liable hereunder. The term "balance of the contract price" as used in this paragraph, shall mean the total amount payable by the JPA to Contractor under the Contract and any amendments thereto, less the amount properly paid by the JPA to Contractor; or

(3) Within fourteen (14) days of notice of elected option by the JPA, tender to the JPA the full amount necessary in order for the JPA to completely perform and carry out completion of the Contract in accordance with its terms and conditions and in order to save the JPA harmless on account of all claims and damages to persons or property, and pay the JPA for all losses, actual damages (including delay and disruption damages), including those arising from delay in meeting either milestone dates or the Contract completion date, expenses, costs and statutory attorney's fees, including appellate proceedings, pursuant to Section 627.756, Florida Statutes.

PROVIDED further that, the Surety shall save the JPA harmless from any and all damages, including expenses, costs, contractual damages, injury, negligence or default, patent infringement and actual damages (including delay and disruption damages) and assessments which may arise by virtue of any defects in work or materials within a period of one (1) year from the date on which the JPA makes final payment under the Contract.

PROVIDED further that, during any interim period after the JPA has declared Contractor to be in default but Surety has not yet remedied the default in the manner chosen by the JPA, Surety shall be responsible for securing and protecting the work site including, but not limited to, the physical premises, structures, fixtures, materials, and equipment, and shall be responsible for securing and protecting materials and equipment stored off-site.

PROVIDED further that, no right of action shall accrue on this bond to or for the use of any person or corporation other than the JPA named herein or the heirs, executors, administrators or successors of the JPA.

IN WITNESS WHEREOF, the said Principal and the said Surety have duly executed this bond the ____ day of _____, 20____.

ATTEST:

ATTEST:

By: _____

Its

By: _____

Its

AS PRINCIPAL

**SIGNED, SEALED AND DELIVERED
IN THE PRESENCE OF:**

ATTEST:

ATTEST:

By: _____

Its

By: _____

Its

AS SURETY

NAME OF AGENT: _____

ADDRESS: _____

TELEPHONE NO: () _____ FACSIMILE NO: () _____

Countersigned:

By: _____

State of Florida

Bond I.D. No: _____

Name of Firm: _____

Address: _____

NOTE: DATE OF BOND MUST NOT BE PRIOR TO DATE OF CONTRACT.

CONTRACT NUMBER _____
PAYMENT BOND
CONTRACT BOND REQUIRED
BY SECTION 255.05, FLORIDA STATUTES

Bond No. _____

As to the Contractor/Principal:

Name: _____

Principal Business Address: _____

Telephone: _____

As to the Surety:

Name: _____

Principal Business Address: _____

Telephone: _____

As to the Owner of the Property/Contracting Public Entity:

Name: _____

Principal Business Address: _____

Telephone: _____

Description of project including address and description of improvements:

Contractor and Surety are each held and firmly bound unto the Jacksonville Port Authority, as a group, and each member individually, as Obligee (hereinafter called Owner), in the amount of _____ DOLLARS (\$ _____), lawful money of the United States of America, for the payment whereof Contractor and surety bind themselves, their respective heirs, executors, administrators, legal representatives, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor and Owner have by written agreement dated the ____ day of _____, 20____, entered into a contract for **ITB C-1965 BIMT EQUIPMENT WASH FACILITY, BLOUNT ISLAND MARINE TERMINAL** all of said work required to be done in strict compliance with the drawings, plans and specifications prepared by the Jacksonville Port Authority Engineering and Construction Department for said work and in strict compliance with the requirements of the contract and all documents included as a part of the contract (hereinafter referred to collectively as the Contract), all of which are by reference made a part hereof to the same extent as if fully set out herein.

Promptly makes payments to all lienors or claimants supplying labor, materials and supplies used directly or indirectly by Contractor in the prosecution of the work provided for in the Contract, including any authorized extensions or modifications thereof, then this bond is void; otherwise, it remains in full force and effect.

PROVIDED, that the Surety hereby waives notice of any alteration or extension of time made by the Owner, and any changes in or under the Contract and compliance or noncompliance with any formalities connected with the Contract or with the changes do not affect Surety's obligation under this bond.

PROVIDED, further, that no action shall be instituted or prosecuted against the Contractor or the Surety on the bond after one (1) year from the performance of the labor or completion of delivery of the materials or supplies, or the date the rental equipment was last on the jobsite available for use.

IN WITNESS WHEREOF, the said Principal and the said Surety have duly executed this bond the ____ day of _____, 20____.

ATTEST:

ATTEST:

By: _____

By: _____

Its

Its PRINCIPAL

SIGNED, SEALED AND DELIVERED IN THE PRESENCE OF:

ATTEST:

ATTEST:

By: _____

By: _____

Its

Its SURETY

NAME OF AGENT: _____

ADDRESS: _____

TELEPHONE NO. (____)_____

FACSIMILE NO: (____)_____

Countersigned:

By: _____

Bond I.D. No: _____

State of Florida

Name of Firm: _____

Address: _____

NOTE: DATE OF BOND MUST NOT BE PRIOR TO DATE OF CONTRACT.



TECHNICAL SPECIFICATIONS

FOR

BIMT EQUIPMENT WASH FACILITY

Project No.: B2023-04

Contract No.: C-1965

BLOUNT ISLAND MARINE TERMINAL

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND MARINE TERMINAL

JACKSONVILLE, FLORIDA

CONTRACT DOCUMENTS

for the construction of the

EQUIPMENT WASH FACILITY

ISSUED FOR BID

JACOBS

September 2024

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This document and the ideas and designs incorporated herein, as an instrument of professional service, is the property of Jacobs and is not to be used in whole or part, for any other project without the written authorization of Jacobs.

Project No. C-1965

Copy No. _____

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

TABLE OF CONTENTS

Pages

SPECIFICATIONS

DIVISION 01—GENERAL REQUIREMENTS

01 11 00	Summary of Work.....	1-	2
01 29 00	Payment Procedures.....	1-	4
01 31 13	Project Coordination	1-	5
01 31 19	Project Meetings	1-	2
01 32 16	Construction Progress Schedule	1-	9
01 33 00	Submittal Procedures	1-	10
	Supplement:		
	Transmittal of Contractor’s Submittal	1-	1
01 42 13	Abbreviations and Acronyms	1-	5
01 43 33	Manufacturers’ Field Services	1-	4
	Supplement:		
	Manufacturer’s Certificate of Proper Installation	1-	1
01 45 16.13	Contractor Quality Control	1-	10
01 50 00	Temporary Facilities and Controls.....	1-	11
01 57 13	Temporary Erosion and Sediment Control	1-	11
01 61 00	Common Product Requirements.....	1-	8
	Supplement:		
	Manufacturer’s Certificate of Compliance	1-	1
01 77 00	Closeout Procedures.....	1-	4

DIVISION 02—EXISTING CONDITIONS

02 41 00	Demolition	1-	4
----------	------------------	----	---

DIVISION 03—CONCRETE

03 10 00	Concrete Forming and Accessories	1-	5
03 15 00	Concrete Joints and Accessories.....	1-	6
03 21 00	Steel Reinforcement.....	1-	4
03 30 00	Cast-in-Place Concrete.....	1-	22
	Supplements:		
	Concrete Mix Design, Class 5000F0S1W2C2	1-	3
	Concrete Mix Design, Class 4500F0S1W1C2	1-	2

JACKSONVILLE PORT AUTHORITY
 BLOUNT ISLAND EQUIPMENT WASH FACILITY

		<u>Pages</u>
03 39 00	Concrete Curing	1- 4
03 62 00	Grouting	1- 10
	Supplement:	
	24-hour Evaluation of Nonshrink Grout Test Form and Grout Testing Procedures	1- 3
DIVISION 04 THROUGH DIVISION 08 (NOT USED)		
DIVISION 09—FINISHES		
09 91 13	Exterior Painting	1- 6
DIVISION 10 THROUGH DIVISION 12 (NOT USED)		
DIVISION 13—SPECIAL CONSTRUCTION		
13 34 19	Metal Building Systems	1- 9
DIVISION 14 THROUGH DIVISION 25 (NOT USED)		
DIVISION 26—ELECTRICAL		
26 05 01	Electrical	1- 29
26 05 70	Electrical Systems Analysis	1- 8
	Supplement:	
	Figure 1: Example Arc Flash Label	1- 1
26 41 00	Facility Lightning Protection	1- 6
DIVISION 27 THROUGH DIVISION 30 (NOT USED)		
DIVISION 31—EARTHWORK		
31 23 13	Subgrade Preparation	1- 3
31 23 16	Excavation	1- 4
31 23 19.01	Dewatering	1- 3
31 23 23	Fill and Backfill	1- 8
31 23 23.15	Trench Backfill	1- 11
DIVISION 32—EXTERIOR IMPROVEMENTS		
32 11 23	Aggregate Base and Subbase Courses	1- 6
32 12 16	Asphalt Paving	1- 19
32 17 23	Pavement Markings	1- 4

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

Pages

DIVISION 33—UTILITIES

33 05 01.09	Polyvinyl Chloride (PVC) Pressure Pipe and Fittings.....	1-	5
33 05 01.12	Gravity Sewer Pipe and Fittings	1-	11
33 05 13	Manholes.....	1-	13
33 05 16.13	Precast Concrete Utility Structure	1-	5
33 13 00	Disinfection of Water Utility Distribution Facilities	1-	5

DIVISION 34 THROUGH DIVISION 49 (NOT USED)

DRAWINGS (BOUND SEPARATELY)

END OF SECTION

SPECIFICATIONS

**SECTION 01 11 00
SUMMARY OF WORK**

PART 1 GENERAL

1.01 PROJECT DESCRIPTION

- A. Jacksonville Port Authority (JAXPORT) intends to construct a new covered equipment wash facility on its Blount Island Marine Terminal (BIMT).
- B. The following roles are referred in these specifications:
 - 1. JAXPORT is the Owner under this Contract.
 - 2. The Engineer of Record and Designer is Jacobs Engineering Group.
 - 3. The Construction Manager, to be determined, will supervise the construction on behalf of the Owner.
 - 4. The Contractor is the General Contractor selected to construct the Wash Facility.
- C. BIMT will be operational at all times during construction. Construction projects are underway in adjacent areas of the terminal. The Contractor shall be cognizant of both construction activities and operational activities on the terminal and shall cooperate and coordinate with the Owner to minimize disruption of other users of the terminal.
- D. Security fences on the perimeter of the terminal shall remain. If fences are damaged by construction activities these must be repaired at the Contractor's cost. If Contractor requires temporary access through security fences, then a temporary gate must be installed by the Contractor for its use, as approved by the Owner. At the end of construction, or when the temporary access is no longer required by the Contractor, the fence must be reinstated identical to that removed.
- E. All construction activities shall be coordinated with the Construction Manager, and JAXPORT.

1.02 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work will be planned and constructed to minimize impacts on other ongoing activities on the terminal. The scope of work shall be as described on the Drawings, and includes, but may not be limited to, the following:
 - 1. Demolition and excavation of existing asphalt pavement in the footprint of the building.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

2. Excavation of trenches for rerouting utilities, including reinstatement of pavements.
3. Storm drainage system adjustments and improvements (catch basins, manholes). Pipes are expected to remain.
4. New oil water separator including reinstatement of pavements.
5. New pre-engineered metal building (PEMB) with a 40 feet by 60 feet concrete foundation and about 30 feet high for the Equipment Wash Facility.
6. Electrical network to provide power to building electrical equipment, lighting, and outlets.
7. Communication infrastructure for future.
8. Other general infrastructure requirements as described on the Drawings.

1.03 OWNER-FURNISHED PRODUCTS

- A. The Owner will be furnishing the spreader pump, pressure washer and compressor along with associated controls for each piece of equipment.

1.04 REFERENCE INFORMATION

- A. Topographic and Utility Survey: Survey performed by Jacobs Engineering Group, Inc., dated July 23, 2019.
- B. Geotechnical Design Report: Report prepared by Jacobs Engineering Group, Inc. dated October 23, 2019. Revised April 09, 2021.
- C. Report of Geotechnical Exploration, BIMT Berths 32 to 35, Jacksonville, Florida. JPA Contract AE-1436. Report prepared by Ellis & Associates for HDR Engineering dated October 13, 2014.
- D. Extract from BIMT Wharf Construction Phase 2 Record Drawings dated November 2023, prepared by HDR Engineering for JPA.
- E. IFC Details of Sanitary Lift Station installed by others under JPA Contract C-1722. Prepared by Jacobs, dated November 28, 2023.
- F. IFC Civil Drawings Extracted from SSA Jacksonville Container Terminal Phase 8, JPA Contract C-1772A, dated November 28, 2023.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

**SECTION 01 29 00
PAYMENT PROCEDURES**

PART 1 GENERAL

1.01 SUBMITTALS

- A. Informational Submittals:
1. Schedule of Values: Submit on Contractor's standard form.
 2. Schedule of Estimated Progress Payments:
 - a. Submit with initially acceptable Schedule of Values.
 - b. Submit adjustments thereto with Application for Payment.
 3. Application for Payment.
 4. Final Application for Payment.

1.02 SCHEDULE OF VALUES

- A. Contractor shall prepare and submit to the Construction Manager a Schedule of Values using the form provided in the contract documents, which includes each phase of the Work under the Agreement. The form shall be submitted before commencement of construction activities.
- B. The values in the Schedule of Values shall include labor, materials, overheads, fees and any other costs included in the Contract Price.
- C. Shop Drawings and Submittals shall be deemed to be included in the overheads of each activity and shall not be a line item in the Schedule of Values.
- D. Record Documents shall be identified as a line item in each phase of the Project in Schedule of Values. As noted in Section 01 77 00, Closeout Procedures, the Contractor shall maintain markups of the Record Documents throughout construction. Payments for Record Documents will be made monthly based on progress approved by the Construction Manager.
- E. Upon request of Construction Manager, provide documentation to support the accuracy of the Schedule of Values.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- F. Lump Sum Work:
 - 1. Reflect specified allowances and alternates, as applicable.
 - 2. List bonds and insurance premiums, mobilization, demobilization, preliminary and detailed progress schedule preparation, equipment testing, facility startup, and contract closeout separately.
 - 3. Break down by Specification Division 02 through Division 49 with appropriate subdivision of each specification.
- G. An unbalanced or front-end loaded Schedule of Values will not be acceptable.
- H. Summation of each phase and the complete Schedule of Values representing all the Work shall equal the Contract Price.
- I. Submit Schedule of Values on a thumb drive, or by email, in a spreadsheet format compatible with latest version of Microsoft Excel.

1.03 SCHEDULE OF ESTIMATED PROGRESS PAYMENTS

- A. The approved Schedule of Values shall be the basis for all progress payments.
- B. Show estimated payment requests throughout Contract duration aggregating initial Contract Price.
- C. Base estimated progress payments on initially acceptable progress schedule. Adjust to reflect subsequent adjustments in progress schedule and Contract Price as reflected by modifications to the Contract Documents.

1.04 APPLICATION FOR PAYMENT

- A. Transmittal Summary Form: Attach one Summary Form with each detailed Application for Payment for each schedule and include Request for Payment of Materials and Equipment on Hand as applicable. Execute certification by authorized officer of Contractor.
- B. Use detailed Application for Payment Form suitable to Construction Manager.
- C. Provide separate form for each schedule as applicable.
- D. Include accepted Schedule of Values for each schedule or portion of lump sum Work and the unit price breakdown for the Work to be paid on a unit priced basis.
- E. Include separate line item for each Change Order and Work Change Directive executed prior to date of submission. Provide further breakdown of such as requested by Construction Manager.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

F. Preparation:

1. Round values to nearest dollar.
2. Submit Application for Payment, including a Transmittal Summary Form and detailed Application for Payment Form(s) for each schedule as applicable, a listing of materials on hand for each schedule as applicable, and such supporting data as may be requested by Construction Manager.

1.05 PAYMENT

- A. Payment for all Lump Sum Work shown or specified in Contract Documents is included in the Contract Price. Payment will be based on a percentage complete basis for each line item of the accepted Schedule of Values.
- B. Payment for Lump Sum Work covers all Work specified or shown within the limits or Specification sections as follows:
 1. Limits of Work are shown on the Drawings.
 2. All Work is shown on the Drawings and described in Specification sections.

1.06 NONPAYMENT FOR REJECTED OR UNUSED PRODUCTS

- A. Payment will not be made for following:
 1. Loading, hauling, and disposing of rejected material.
 2. Quantities of material wasted or disposed of in manner not called for under Contract Documents.
 3. Rejected loads of material, including material rejected after it has been placed by reason of failure of Contractor to conform to provisions of Contract Documents.
 4. Material not installed in the Works.
 5. Defective Work not accepted by Construction Manager.
 6. Material remaining on hand after completion of Work.

1.07 PARTIAL PAYMENT FOR STORED MATERIALS AND EQUIPMENT

- A. Partial Payment: No partial payments will be made for materials and equipment delivered or stored unless Shop Drawings and preliminary operation and maintenance data is acceptable to Construction Manager.
- B. Final Payment: Will be made only for products incorporated in Work; remaining products, for which partial payments have been made, shall revert

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

to Contractor unless otherwise agreed, and partial payments made for those items will be deducted from final payment.

1.08 PARTIAL PAYMENT FOR UNDELIVERED, PROJECT-SPECIFIC
MANUFACTURED OR FABRICATED EQUIPMENT

- A. Notwithstanding above provisions, partial payments for undelivered (not yet delivered to Site or not stored in the vicinity of Site) products specifically manufactured for this Project, excluding off the shelf or catalog items, will be made for products listed below when all following conditions exist:
1. Partial payment request is supported by written acknowledgment from Suppliers that invoice requirements have been met.
 2. Equipment is adequately insured, maintained, stored, and protected by appropriate security measures.
 3. Each equipment item is clearly marked and segregated from other items to permit inventory and accountability.
 4. Authorization has been provided for access to storage Site for Construction Manager and Tenant.
 5. Equipment meets applicable Specifications of these Contract Documents.
- B. Payment of 15 percent of manufacturer's quoted price for undelivered, Project-specific manufactured equipment will be made following Shop Drawing approval. Thereafter, monthly payments will be made based on progress of fabrication as determined by Construction Manager, but in no case will total of payments prior to delivery exceed 75 percent of manufacturer's quoted price.
- C. Failure of Contractor to continue compliance with above requirements shall give cause for Owner to withhold payments made for such equipment from future partial payments.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 31 13
PROJECT COORDINATION

PART 1 GENERAL

1.01 SUBMITTALS

A. Informational:

1. Statement of Qualification (SOQ) for land surveyor or civil engineer.
2. Statement of Qualification for Independent Testing Agencies, together with a signed certification that Principals with the Agencies do not have a commercial interest or share ownership with the Contractor or Subcontractors, or their Principals.

1.02 RELATED WORK AT SITE

A. General:

1. Ongoing Operations is the daily operation of BIMT, JAXPORT and JAXPORT tenants.
2. Other Work is work that is either directly or indirectly related to scheduled performance of the Work under these Contract Documents, listed henceforth, anticipated to be performed onsite by others.
3. Coordinate the Work of these Contract Documents with Other Work and Ongoing Operations of others as specified in General Conditions.
4. Include phasing and sequencing constraints specified herein as a part of Progress Schedule.

1.03 PROJECT PHASES

- A. General: Include the Phases if specified herein as a part of the Progress Schedule required under Section 01 32 16, Construction Progress Schedule.

1.04 WORK SEQUENCING/CONSTRAINTS

- A. Include constraints related to Other Work proposed by Owner or Tenants in the Progress Schedule.

1.05 FACILITY OPERATIONS

- A. Continuous operation of Tenants' facilities is of critical importance. Schedule and conduct activities to enable existing facilities and areas of the facility to operate continuously.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- B. Perform Work continuously during critical connections and handovers, and as required to prevent interruption of Tenants' operations.
- C. When necessary, plan, design, and provide various temporary services, utilities, connections, temporary piping and heating, access, and similar items to maintain continuous operations of Owner's and Tenants' facilities.
- D. Do not close lines, open or close valves, or take other action which would affect the operation of existing systems, except as specifically required by the Contract Documents and after authorization by Construction Manager. Such authorization (if given) will be notified within 48 hours after receipt of Contractor's written request.
- E. Do not proceed with Work affecting a facility's operation without obtaining Construction Manager's advance approval of the need for and duration of such Work.
- F. Relocation of Existing Underground Facilities:
 - 1. During construction, it is expected that minor relocations of existing underground facilities will be necessary.
 - 2. Provide complete relocation of existing structures and Underground Facilities, including piping, utilities, equipment, structures, electrical conduit wiring, electrical duct bank, and other necessary items.
 - 3. Use only new materials for relocated facility. Match materials of existing facility, unless otherwise shown or specified.
 - 4. Perform relocations to minimize downtime of existing facilities.
 - 5. Install new portions of existing facilities in their relocated position prior to removal of existing facilities, unless otherwise accepted by Construction Manager.

1.06 ADJACENT FACILITIES AND PROPERTIES

- A. Examination:
 - 1. After Effective Date of the Agreement and before Work at Site is started, Owner, Contractor, Construction Manager, and Tenants (if applicable) shall make a thorough examination of pre-existing conditions including existing buildings, structures, and other improvements in vicinity of Work, as applicable, which could be damaged or affected by construction operations.
 - 2. Periodic reexamination shall be jointly performed to include, but not limited to, cracks in structures, settlement, leakage, and similar conditions.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- B. Documentation: Record and submit documentation of observations made on examination inspections in accordance with Article Construction Photographs.

1.07 REFERENCE POINTS AND SURVEYS

- A. Location and elevation of benchmarks are shown on the Drawings. This control may be used by the Contractor, but condition of these points at the time of construction is not to be assumed. Contractor's bid should include reestablishment of control Points as required. Verification or reinstatement of control points is to be by a Professional Land Surveyor, registered in the State of Florida.
- B. Contractor's Responsibilities:
 - 1. Provide additional survey and layout required to layout the Work, being cognizant of ongoing work in adjacent areas.
 - 2. Check and establish exact location of existing facilities prior to construction of new facilities and any connections thereto.
 - 3. Verify locations of existing utilities before excavation and avoid damage to existing underground infrastructure. Repair of damage to functioning infrastructure shall be at the Contractor's cost.
 - 4. In event of discrepancy in data or staking provided by Owner, request clarification from Construction Manager before proceeding with Work.
 - 5. Retain professional land surveyor or civil engineer registered in State of Florida who shall perform or supervise engineering surveying necessary for additional construction staking and layout.
 - 6. Maintain complete accurate log of survey work as it progresses as a Record Document.
 - 7. On request of Construction Manager, submit documentation.
 - 8. Provide competent employee(s), tools, stakes, other equipment and materials and make available to Construction Manager who may require to:
 - a. Verify control points, lines, and easement boundaries.
 - b. Check layout, survey, and measurement work performed by others.
 - c. Measure quantities for payment purposes.

1.08 CONSTRUCTION PHOTOGRAPHS

- A. General:
 - 1. Photographically document all phases of the project, including preconstruction, construction progress, and post-construction
 - 2. Photograph and video structures and adjoining construction prior to any demolition activities.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3. Construction Manager shall have the right to select the subject matter and vantage point from which photographs are to be taken.
 4. Digital Images: No post-session electronic editing of images is allowed. Stored image shall be actual image as captured without cropping or other edits.
- B. Preconstruction and Post-Construction:
1. Emphasis shall be directed to structures both inside and outside the Site.
 2. Format: Digital, minimum resolution of 1024 pixels by 728 pixels.
- C. Construction Progress Photos:
1. Photographically demonstrate progress of construction, showing every aspect of Site and adjacent properties as well as interior and exterior of new or impacted structures.
 2. Weekly: Take exposures using Digital camera, minimum resolution of 1024 pixels by 728 pixels.
- D. Digital Images:
1. Archive using a commercially available photo management system.
 2. Label each disk with Project and Owner's name, and week and year images were produced.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 SALVAGE OF MATERIALS

- A. Materials to be salvaged include:
1. Lime rock from existing pavement. Intent is to reuse the old lime rock to repair the pavement subgrade after excavation in compliance with Specifications.

3.02 CUTTING, FITTING, AND PATCHING

- A. Cut, fit, adjust, or patch Work and work of others, including excavation and backfill as required, to make Work complete.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- B. Obtain prior written authorization of Construction Manager and Tenant before commencing Work to cut or otherwise alter:
 - 1. Structural or reinforcing steel, structural column or beam, elevated slab, trusses, or other structural member.
 - 2. Weather-resistant or moisture-resistant elements.
 - 3. Efficiency, maintenance, or safety of element.
 - 4. Work of others.

- C. Refinish surfaces to provide an even finish.
 - 1. Refinish continuous surfaces to nearest intersection.
 - 2. Refinish entire assemblies.
 - 3. Finish restored surfaces to such planes, shapes, and textures that no transition between existing work and the Work is evident in finished surfaces.

- D. Restore existing work, Underground Facilities, and surfaces that are to remain in completed Work including concrete-embedded piping, filling trenches, reinstating pavements, conduits, and other utilities as specified and as shown on the Drawings.

- E. Make restorations with new materials and appropriate methods as specified for new Work of similar nature; if not specified, use recommended practice of manufacturer or appropriate trade association.

- F. Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces and fill voids.

- G. Remove specimens of installed Work for testing when requested by Construction Manager.

END OF SECTION

**SECTION 01 31 19
PROJECT MEETINGS**

PART 1 GENERAL

1.01 GENERAL

- A. Construction Manager will schedule physical arrangements for meetings throughout progress of the Work, prepare meeting agenda with regular participant input and distribute with written notice of each meeting, preside at meetings, record minutes to include significant proceedings and decisions, and reproduce and distribute copies of minutes within 5 business days after each meeting to participants and parties affected by meeting decisions.

1.02 PRECONSTRUCTION CONFERENCE

- A. Contractor shall be prepared to discuss the following subjects, as a minimum:

1. Required schedules as specified in Division 01, General Requirements.
2. Status of Bonds and insurance.
3. Sequencing of critical path work items.
4. Progress payment procedures.
5. Submittal schedule.
6. Project changes and clarification procedures.
7. Use of Site, access, office and storage areas, security and temporary facilities.
8. Major product delivery and priorities.
9. Contractor's safety plan and representative.

- B. Attendees will include:

1. Owner's representatives.
2. Contractor's office representative.
3. Contractor's resident superintendent.
4. Contractor's quality control representative.
5. Subcontractors' representatives whom Contractor may desire or Construction Manager may request to attend.
6. Construction Manager's representatives.
7. Others as appropriate.

1.03 PRELIMINARY SCHEDULES REVIEW MEETING

- A. As set forth in General Conditions and Section 01 32 16, Construction Progress Schedule.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

1.04 PROGRESS MEETINGS

- A. Construction Manager will schedule regular progress meetings at Site, conducted bi-weekly to review the Work progress, Progress Schedule, Schedule of Submittals, Application for Payment, contract modifications, and other matters needing discussion and resolution.
- B. Attendees will include:
 - 1. Contractor, Subcontractors, and Suppliers, as appropriate.
 - 2. Construction Manager's representative(s).
 - 3. Others as appropriate.

1.05 PREINSTALLATION MEETINGS

- A. When required in individual specification sections, convene at Site prior to commencing the Work of that section.
- B. Require attendance of entities directly affecting, or affected by, the Work of that section.
- C. Notify Construction Manager 4 business days in advance of meeting date.
- D. Provide suggested agenda to Construction Manager to include reviewing conditions of installation, preparation and installation or application procedures, and coordination with related Work and work of others.

1.06 OTHER MEETINGS

- A. Safety meetings shall be conducted regularly in accordance with Contractor's Health and Safety Plan. At least once per month, the Owner and the Construction Manager shall be invited to the Contractor's safety meetings. As the Contractor will be working on an operational terminal, the Contractor's representatives shall attend the Owner's safety meetings whenever invited.
- B. In accordance with Contract Documents and as may be required by Owner and Construction Manager.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 32 16
CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall prepare, revise, and maintain the Preliminary Progress Schedule, Baseline Progress Schedule, all Monthly Updates and all Recovery Schedules. The Contractor's second payment application/invoice shall not be released for payment by the Owner until after the Contractor has submitted a Baseline Progress Schedule and that schedule has been approved by the Owner and the Construction Manager.

1.02 DEFINITIONS

- A. Preliminary Progress Schedule: A detailed Critical Path Method (CPM) schedule reflecting the Contractor's plan for the first 60 days of work.
- B. Baseline Progress Schedule: A CPM schedule reflecting the Contractor's detailed plan of work for the entire Project starting with Notice to Proceed and ending with Final Completion. The Baseline Progress Schedule will have no progress reflected in it and all activity remaining durations shall equal the original durations.
- C. Monthly Update: A version of the Progress Schedule submitted by the Contractor to the Construction Manager on a monthly basis showing actual progress made as of the data date of the schedule.
- D. Recovery Schedule: A version of the Progress Schedule submitted by the Contractor to the Construction Manager that contains logic revisions reflecting the Contractor's plan to make up for delays and attaining the current contractual milestone dates and/or Project completion dates.
- E. Written Narrative: A written report containing a section providing an executive summary of the status of the Project as well as sections discussing in detail; the labor and equipment composition of each work crew on the Project along with a listing of the major items of work each crew will perform; each and every logic change (activities added or deleted, constraints added or deleted, leads/lags added or deleted, relationships amongst activities added or deleted, original duration changes, calendar changes, etc.) made since the previous schedule submission; progress made; less than expected progress made; better than expected progress made; the manner in which seasonal conditions have been taken into account in the schedule; delays

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

incurred; anticipated delays that may be incurred; impacts to the Progress Schedule experienced during the update period; any shifts in the critical paths to contractual milestones or Project completion along with an explanations of why the shifts occurred. The written narrative shall address all delays and/or improvements made to the critical path to substantial completion as well as to the critical paths to all contractual milestones, and shall also address corrective action(s) taken, planned to be taken or proposed to be taken to mitigate delays experienced as of the data date of the schedule.

- F. Two-Week Look Behind and Look Ahead Schedule: A version of the latest Monthly Update filtered to show only the activities planned to take place within the previous and next 2 weeks.

1.03 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, addendums and other parts of the Contract Documents apply to this section.

1.04 SUBMITTALS

- A. Submittal and Distribution: Within 15 calendar days of the issuance of the Notice to Proceed, the Contractor shall submit its Preliminary Project Schedule reflecting the Contractor's plan for the first 60 days of work for review by the Owner and Construction Manager.
- B. Submittal and Distribution: Within 30 calendar days of the issuance of the Notice to Proceed, the Contractor shall submit its Baseline Progress Schedule for review by the Owner and Construction Manager.
- C. Schedule Updating: The Progress Schedule shall be updated and submitted to the Owner in accordance with the following schedule.
 - 1. Once every month on the date determined by the Construction Manager.
 - 2. After each meeting or other activity where a need for schedule revisions or an update, as determined solely by the Construction Manager, has been recognized.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- D. Distribution and Deliverables: In addition to the deliverables noted elsewhere in the Contract Documents, the following shall be provided by the Contractor in both hard copy and electronic formats as part of the submissions for the Preliminary Progress Schedule, the Baseline Progress Schedule, Monthly Updates and each Recovery Schedule. The Contractor shall provide the Owner and Construction Manager with an electronic data file of the schedule with each submission. All revisions shall be noted in the written narrative report. An electronic copy of the following is to be included per submittal. No activities are to be filtered out of bar charts or report sort printouts unless the filtering has been approved by the Construction Manager.
1. Written narrative report.
 2. Bar chart sorted by total float/early start in pdf and printable in color on 11-inch by 17-inch paper.
 3. Bar charts showing the critical path/longest path to substantial completion, final completion and all interim contractual milestones in pdf and printable in color on 11-inch by 17-inch paper.
 4. Bar chart with activities sorted by early start/early finish and logically grouped by physical location/area of the work and the type of work in pdf and printable in color on 11-inch by 17-inch paper.
 5. A report sort generated by computer software that identifies and describes in detail each and every logic revision made in the schedule.
 6. Activity ID report sort.
 7. Total Float, early start/early finish report sort.
 8. Early start/early finish report sort.
 9. Predecessor-successor report sort.
 10. Summary bar charts for all major areas of work and for all major types of work in pdf and printable in color on 11-inch by 17-inch paper.
 11. Unless otherwise directed by the Owner, all schedule bar chart printouts shall show: Activity ID, Activity Description, Calendar, Original Duration, Remaining Duration, Percent Complete, Early Start, Early Finish, Late Start, Late Finish and Total Float.
 12. Additional computer sorts in pdf and printable in color on various sizes of paper as required by the Construction Manager. At a minimum the Contractor will be required to provide one plot of the schedule printed on Size E sheets.
- E. Regular Project Meetings: At each regular project meeting the Contractor shall issue a Two-Week Look Behind and Look Ahead schedule to each of the participants. Should the Look Behind and Look Ahead Schedule not agree with the Base Line Schedule, the Contractor is to prepare a recovery schedule at no expense to the Owner.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- F. Application for Payments: The Contractor shall include the latest project schedule in each monthly Application for Payment.
- G. Suspension of Payments: The submission and updating of the Progress Schedule is critical to the success of the Project and the ability of all parties to manage the work. The Owner shall have the right to withhold progress payments if the Contractor fails to submit Monthly Updates or Recovery Schedules as specified.

1.05 QUALITY ASSURANCE

- A. Contractor's Designated Scheduler: The Contractor shall designate an individual as its Scheduler. The Contractor may engage, at its option, an outside consultant to assist with planning, evaluating, updating and reporting of the Progress Schedule and Monthly Updates, or if the Contractor employs skilled in-house personnel with experience in CPM scheduling and reporting techniques the Contractor may use in-house personnel. The qualifications of the Contractor's Designated Scheduler shall be submitted to the Construction Manager for approval. If, at any time and for any reason, the Construction Manager rescinds its approval of the Contractor's Designated Scheduler the Contractor shall replace its Scheduler with a different Scheduler that receives approval by the Construction Manager, and the replacement shall be at no additional cost to the Owner.

PART 2 PRODUCTS

2.01 SCHEDULING SOFTWARE

- A. The Contractor shall use P6 Primavera Project Planner (latest version available); a proprietary computer software program developed by Primavera Systems, Inc., Bala Cynwyd, PA 19004.

PART 3 EXECUTION

3.01 SCHEDULE REQUIREMENTS

- A. Prepare network analysis diagrams and supporting mathematical analyses using Critical Path Method, under concepts and methods outlined in AGC's "The Use of CPM in Construction - A Manual for General Contractors and the Construction Industry."

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- B. **Schedule Detail and Clarity:** The Progress Schedule and all Monthly Updates and Recovery Schedules shall comply with the various limits imposed by the scope of work and by any contractually specified intermediate milestone dates, phasing, and completion dates included in the Contract Documents. The degree of detail provided in the schedule shall be to the satisfaction of Construction Manager. The Contractor shall develop the schedule in sufficient detail and clarity so that the Contractor can plan, schedule and control the work adequately and so that the Construction Manager can readily monitor and follow the progress of all portions of the work. The determination as to whether or not the Progress Schedule contains sufficient detail and clarity will be made solely by the Construction Manager, and any additional detail required by the Construction Manager shall be added to the Progress Schedule by the Contractor at no additional cost to the Owner. At the Construction Manager's sole discretion, the Construction Manager may require that mandatory scheduling meetings be held after the Contractor submits the Baseline Progress Schedule and it is approved by the Owner and Construction Manager. Such mandatory meetings shall be attended by the Contractor, the Contractor's Designated Scheduler and any of the Contractor's subcontractors that the Construction Manager requests to attend. The Progress Schedule in no way takes the place of the Contractor's field coordination. The Contractor shall provide the Owner and Construction Manager with electronic copies of all schedules in both PDF file format and Primavera P6 software backup file format.
- C. **Construction Manager's Acceptance:** The Construction Manager's acceptance of any Progress Schedule, Recovery Schedule or Monthly Update in no way changes, alters or amends the requirements of the Contract Documents and in no way warrants that the schedule as a whole or that the logic, activity sequencing or activity durations contained in the schedule are reasonable or attainable.
- D. **Coordination of the Owner's Needs:** The Owner may have specific needs for phasing of site/construction access and other issues as outlined in the Contract Documents which are to be coordinated within the Progress Schedule. No additional costs will be considered for coordinating the phasing needs and/or reasonable sequencing needs of the Owner.
- E. **Progress Status in Monthly Updates:** The Contractor shall prepare all schedules and all Monthly Updates based upon the actual progress made on the Project, including but not limited to; work performed; the preparation of submittals; the review of submittals; progress on fabrication and deliveries; testing, inspections and startups. The schedule shall be used to plan and organize the work (in conjunction with the Contractor's field coordination

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

efforts), record and report actual performance and progress, and show how the Contractor plans to complete all remaining work.

- F. **Schedule Revisions:** When the Progress Schedule and Monthly Updates are accepted by the Construction Manager, those schedules shall be entered into the Project Record. The schedule may be revised by the Contractor to accurately reflect changes in the Contractor's planned activity durations, sequence of work, methods or manners of performance, delays, changes, and additions or deletions to the scope of work only after the Contractor's proposed revisions have been submitted to the Construction Manager and the Construction Manager's subsequent acceptance of the revisions. All Contractor-proposed schedule revisions shall be submitted to the Construction Manager separate from the submission of Monthly Updates, and the revisions shall not be incorporated into any schedules or Monthly Updates unless the revisions have been accepted by the Construction Manager.
- G. **Float:** The Contractor acknowledges that float belongs to the Project and is to be shared by the Owner and the Contractor. Any use of float by the Contractor or Owner shall not be reason to extend the Contract Completion Date.
- H. **Time Frame:** The schedule shall run from the date established for the Notice to Proceed to date of Final Completion. The contractual Contract Completion Date and contractual Milestone Dates shall not be changed by the submission of, or the acceptance of a schedule that shows an early completion date or a late completion date, unless specifically authorized by Change Order.
- I. **Activities:**
 - 1. Treat each item of work as a separate numbered activity for each principal element of the Work. All activity durations shall take into account the effects of normal seasonal weather conditions on the work. Comply with the following:
 - a. Revise first subparagraph below to suit Project. Long activity durations provide less detail and, therefore, less information with which to manage a project. As an alternative to specifying activity duration, indicate minimum and maximum number of activities, which will result in a similar effect.
 - 1) **Activity Codes:** Each activity shall be coded in a logical manner to facilitate the schedule activities being sorted and/or grouped by physical area/location, type of work, subcontractor or crews performing the work, etc.
 - 2) **Activity Descriptions:** Each activity shall have a unique description that is used only once and allows readers to

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- ascertain the physical area/location and type of work without referencing the activity's codes noted above.
- 3) Activity Durations: Define activities so no activity has a duration longer than 21 calendar days or 15 workdays without prior approval from the Owner.
 - 4) Submittal, Review and Approval and Procurement Activities: Include submittal, review and approval and procurement activities for all major items as separate activities in schedule. Submittal review times shall be as specified in the Contract Documents. Coordinate submittal review times in Contractor's Construction Schedule with the Contractor's Submittal Schedule.
 - 5) Startup and Testing Time: Unless otherwise approved by the Construction Manager, include not less than 30 days for any startup and testing.
 - 6) Substantial Completion and Contractual Milestones: Indicate completion of the Contractor's work in advance of the contractual dates for Substantial Completion and Milestones and allow time for the Construction Manager's and Owner's administrative procedures necessary for certification of Substantial Completion.
 - 7) Work by Owner: Include a separate activity for each portion of the Work to be performed by the Owner, including Owner-furnished materials, products or equipment, if applicable.
- J. Constraints and Logic Relationships: No activities within the Progress Schedule, Monthly Updates or Recovery Schedules shall have constraints and/or logic relationships other than Finish-to-Start relationships with a zero (0) lead/lag or Start-to-Start relationships without receiving prior approval from the Construction Manager. The use of Progress Override is strictly prohibited. All schedules shall be run using Retained Logic.
- K. Work Stages:
1. Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Subcontract awards.
 - b. Submittals.
 - c. Approvals.
 - d. Procurement, fabrication and deliveries.
 - e. Installation.
 - f. Concrete curing.
 - g. Testing and inspections.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- h. Adjusting.
 - i. Startup and placement into final use and operation.
 - j. Permit restrictions or prohibitions.
- L. Milestones: Include activities representing the milestones indicated in the Contract Documents in the schedule, including but not limited to, the Notice to Proceed, Substantial Completion and Final Completion.
- M. Calendars: The primary calendar in the Progress Schedule will be a 5-day workday calendar with work scheduled for Monday through Friday with the exception that major holidays recognized by the Contract Documents shall be nonworkdays. Other calendars, such as a 7-day workday calendar for concrete curing activities, may be assigned to activities with prior approval from the Construction Manager.
- N. Recovery Schedules: If the Contractor fails to achieve planned progress as indicated in accepted schedules and the Contractor's lack of progress shows delays to attaining Substantial Completion, Project Completion or any contractual Milestone(s) by more than 10 calendar days (either monthly or cumulatively); the Construction Manager may direct the Contractor to submit a proposed Recovery Schedule indicating how the Contractor plans to recover the time lost and attain the contractual dates noted above. All Recovery Schedules shall be prepared and submitted at no additional cost to the Owner. If the Contractor fails to submit a Recovery Schedule and/or fails to follow or otherwise attain progress in accordance with the Recovery Schedule, the Construction Manager may immediately direct the Contractor to accelerate completion of all late activities by whatever means necessary, including adding personnel and/or equipment, working overtime and/or double shifts, etc., without any additional costs to the Owner. The Owner may withhold future progress payments until the Contractor's progress on the Work is in accordance with the latest accepted Progress Schedule, Recovery Schedule or Monthly Update.
- O. Weekly Schedule Updates: If at a point in time within two months prior to the contractual Substantial Completion Date (as adjusted by executed change orders), in the Construction Manager's sole judgment it appears likely that the Substantial Completion Date will not be met, the Construction Manager may direct the Contractor to submit schedule updates on a weekly rather than monthly basis. The weekly schedule updates shall be provided until the Construction Manager no longer wishes to receive them and at no additional cost to the Owner.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3.02 RELIANCE ON SCHEDULE

A. Expediting Activities:

1. Should any critical path activity fail to be completed within 10 calendar days after the indicated schedule date, if directed to do so by the Construction Manager, the Contractor shall expedite completion of the activity by whatever means the Construction Manager deems appropriate and/or necessary without additional cost to the Owner.
2. Should any critical path activity be 28 or more calendar days behind schedule the Owner shall have the right to perform the activity, or to have the activity performed by another contractor using whatever means and method the Owner may deem appropriate. Costs incurred by the Owner in performing this activity or having it performed by another contractor shall be deducted from the Contractor's Contract Price.
3. It is expressly understood and agreed that any failure by the Owner to exercise the option to direct the Contractor to expedite an activity or to have an activity performed by another contractor shall not be construed as precedent for any other activities or as waiver of the Owner's rights to exercise this right on subsequent occasions.

END OF SECTION

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 DEFINITIONS

- A. Action Submittal: Written and graphic information submitted by Contractor in full accordance with the Specifications and Drawings that requires Construction Manager's and/or Engineer of Record's approval.
- B. Informational Submittal: Information submitted by Contractor that requires Construction Manager's review and determination that submitted information is in accordance with the Conditions of the Contract and the Specifications.
- C. Schedule of Submittals: A schedule of all submittals required by the Specifications and Drawings together with estimated date of submittal, including Action and Informational Submittals. See Article Informational Submittals, Paragraph Schedules of this specification.

1.02 PROCEDURES

- A. Direct submittals to Construction Manager.
- B. Electronic Submittals: Submittals shall, unless specifically directed, be made in electronic format.
 - 1. Each submittal shall be an electronic file in Adobe Acrobat Portable Document Format (PDF). Use the latest version available at time of execution of the Agreement.
 - 2. Each submittal shall clearly reference Specification Section or Drawing and refer to clause or note for clarity. Contractor shall confirm compliance by comparing with requirements of Specifications or Drawings.
 - 3. Contractor shall only provide information required by Specifications or Drawings and shall not pad out submittals with superfluous information.
 - 4. Electronic files that contain more than 10 pages in PDF format shall contain internal bookmarking from an index page to major sections of the document.
 - 5. PDF files shall be set to open "Bookmarks and Page" view.
 - 6. Add general information to each PDF file, including title, subject, author, and keywords.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

7. PDF files shall be set up to print legibly and to scale at 8.5-inch by 11-inch, 11-inch by 17-inch, or 22-inch by 34-inch. No other paper sizes will be accepted.
8. Submit new electronic files for each resubmittal.
9. Include a copy of the Transmittal of Contractor's Submittal form, located at end of section, with each electronic file.
10. Construction Manager will reject submittal that is not electronically submitted, unless specifically requested in hard copy.
11. Provide Construction Manager with authorization to reproduce and distribute each file as many times as necessary for Project documentation or for other parties' review such as the Owner, or Engineer of Record.
12. Detailed procedures for handling electronic submittals will be discussed at the preconstruction conference.

C. Transmittal of Submittal:

1. Contractor shall:
 - a. Review each submittal and check for compliance with Contract Documents before submitting to Construction Manager.
 - b. Stamp each submittal with uniform approval stamp before submitting to Construction Manager.
 - 1) Stamp to include Project name, submittal number, Specification number, Contractor's reviewer name, date of Contractor's approval, and statement certifying submittal has been reviewed, checked, and approved for compliance with Contract Documents.
 - 2) Construction Manager will not review submittals that do not bear Contractor's approval stamp and will return them without action.
 - 3) Construction Manager will not review submittals that include excessive information not required by the Specifications or Drawings.
 - 4) Where submittals include manufacturer's brochures these shall be clearly marked to highlight the specific items being submitted for approval or may be rejected.
2. Complete, sign, and transmit with each submittal package, one Transmittal of Contractor's Submittal form in format approved by Construction Manager. See form at the end of this section for an example.
3. Identify each submittal with the following:
 - a. Numbering and Tracking System:
 - 1) Sequentially number each submittal.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- 2) Resubmission of submittal shall have original number with sequential alphabetic suffix.
 - b. Specification section and paragraph to which submittal applies.
 - c. Project title and Owner's project number.
 - d. Date of transmittal.
 - e. Names of Contractor, Subcontractor or Supplier, and manufacturer as appropriate.
 4. Identify and describe each deviation or variation from Contract Documents with justification. Deviations or variations may be rejected by Construction Manager.
- D. Format:
1. Do not base Shop Drawings on reproductions of Contract Documents.
 2. Package submittal information by individual specification section. Do not combine different specification sections together in submittal package, unless otherwise directed in specification.
 3. Present in a clear and thorough manner and in sufficient detail to show kind, size, arrangement, and function of components, materials, and devices, and compliance with Contract Documents.
 4. Index with labeled tab dividers in orderly manner.
- E. Timeliness: Schedule and submit in accordance Schedule of Submittals, and requirements of individual specification sections.
- F. Processing Time:
1. Time for review shall commence on Construction Manager's receipt of submittal.
 2. Construction Manager will act upon Contractor's submittal and transmit response to Contractor not later than 10 working days after receipt, unless otherwise specified.
 3. Resubmittals will be subject to same review time of 10 working days.
 4. No adjustment of Contract Times or Price will be allowed as a result of delays in progress of Work caused by rejection and subsequent resubmittals.
- G. Resubmittals: Clearly identify each correction or change made.
- H. Incomplete Submittals:
1. Construction Manager will return entire submittal for Contractor's revision if preliminary review deems it incomplete.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

2. When any of the following are missing, submittal will be deemed incomplete:
 - a. Contractor's review stamp; completed and signed.
 - b. Transmittal of Contractor's Submittal; completed and signed.
 - c. Insufficient number of copies (if hard copy requested).
 - d. Excessive information not relevant to submittal.
 - e. Unclear reference to specific materials being submitted.
- I. Submittals not required by Contract Documents will not be reviewed and will be returned stamped "Not Subject to Review."

1.03 ACTION SUBMITTALS

- A. Prepare and submit Action Submittals required by individual specification sections and submit in accordance with the Schedule of Submittals.
- B. Action Submittals shall comply with the requirements of Article Procedures.
- C. Shop Drawings:
 1. Identify and Indicate:
 - a. Applicable Contract Drawing and Detail number, products, units and assemblies, and system or equipment identification or tag numbers.
 - b. Equipment and Component Title: Identical to title shown on the Drawings.
 - c. Critical field dimensions and relationships to other critical features of Work. Note dimensions established by field measurement.
 - d. Project-specific information drawn accurately to scale.
 - e. Manufacturer's standard schematic drawings and diagrams as follows:
 - 1) Modify to delete information that is not applicable to the Work.
 - 2) Supplement standard information to provide information specifically applicable to the Work.
 - f. Product Data: Provide as specified in individual specifications.
- D. Deferred Submittal: See Drawings for list of deferred submittals.
 1. Contractor-design drawings and product data related to permanent construction.
 - a. Written and graphic information.
 - b. Drawings.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- c. Cut sheets.
 - d. Data sheets.
 2. Action item submittals requested in individual specification section.
 - a. Prior to installation of indicated structural or nonstructural element, equipment, distribution system, or component or its anchorage, submit required supporting data and drawings for review and acceptance by Construction Manager. Documentation of review and approval provided on Construction Manager's comment form, along with completed submittal, shall be filed with permitting agency by Contractor and approved by permitting agency prior to installation.
 3. Foreign Manufacturers: When proposed, include names and addresses of at least two companies that maintain technical service representatives close to Project. Note that this Project is "Buy American."
- E. Samples:
 1. Copies: Two, unless otherwise specified in individual specifications.
 2. Preparation: Mount, display, or package Samples in manner specified to facilitate review of quality. Attach label on unexposed side that includes the following:
 - a. Manufacturer name.
 - b. Model number.
 - c. Material.
 - d. Sample source.
 3. Manufacturer's Color Chart: Units or sections of units showing full range of colors, textures, and patterns available.
 4. Full-size Samples:
 - a. Size as indicated in individual specification section.
 - b. Prepared from same materials to be used for the Work.
 - c. Cured and finished in manner specified.
 - d. Physically identical with product proposed for use.
- F. Action Submittal Dispositions:
 1. Construction Manager will review, comment, stamp, and distribute as noted. The meanings shall be:
 - a. Approved:
 - 1) Contractor may incorporate product(s) or implement Work covered by submittal.
 - 2) Distribution: One electronic copy furnished each to Owner, Construction Manager, and/or Engineer of Record, if specifically requested by Construction Manager.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- b. Approved as Noted:
 - 1) Contractor may incorporate product(s) or implement Work covered by submittal, in accordance with Construction Manager's notations. If the Contractor does not accept or implement the Construction Manager's notation the submittal is not approved.
 - 2) Distribution: One electronic copy furnished each to Owner, Construction Manager, and/or Engineer of Record, if specifically requested by Construction Manager.
- c. Partial Approval, Resubmit as Noted:
 - 1) Make corrections or obtain missing portions and resubmit.
 - 2) Except for portions indicated that require clarification, Contractor may begin to incorporate product(s) or implement Work covered by submittal, in accordance with Construction Manager's notations.
 - 3) Distribution: One electronic copy furnished each to Owner, Construction Manager, and/or Engineer of Record, if specifically requested by Construction Manager.
- d. Revise and Resubmit:
 - 1) The submittal requires clarifications, and no portion of the submittal can be approved.
 - 2) Contractor may not incorporate product(s) or implement Work covered by submittal.
 - 3) Distribution: One electronic copy furnished each to Owner, Construction Manager, and/or Engineer of Record, if specifically requested by Construction Manager.
- e. Not Approved:
 - 1) The submittal does not comply with the Drawings or Specifications.
 - 2) Contractor may not incorporate product(s) or implement Work covered by submittal.
 - 3) The Contractor shall submit products or materials to comply with the Contract Documents.

1.04 INFORMATIONAL SUBMITTALS

A. General:

- 1. Refer to individual specification sections for specific submittal requirements.
- 2. Construction Manager will review each submittal. If submittal meets conditions of the Contract, Construction Manager will forward copy to appropriate parties. If Construction Manager determines submittal does not meet conditions of the Contract and is therefore considered

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

unacceptable, Construction Manager will retain one copy and return remaining copy with review comments to Contractor and require that submittal be corrected and resubmitted.

- B. Certificates:
 - 1. General:
 - a. Provide notarized statement that includes signature of entity responsible for preparing certification.
 - b. Signed by officer or other individual authorized to sign documents on behalf of that entity.
 - 2. Welding: In accordance with individual specification sections.
 - 3. Installer: Prepare written statements on manufacturer's letterhead certifying installer complies with requirements as specified in individual specification section.
 - 4. Material Test: Prepared by qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
 - 5. Certificates of Successful Testing or Inspection: Submit when testing or inspection is required by Laws and Regulations or governing agency or specified in individual specification sections.
 - 6. Manufacturer's Certificate of Compliance: In accordance with Section 01 61 00, Common Product Requirements.
 - 7. Manufacturer's Certificate of Proper Installation: In accordance with Section 01 43 33, Manufacturers' Field Services.
- C. Construction Photographs and/or Video: In accordance with Section 01 31 13, Project Coordination, and as may otherwise be required in Contract Documents.
- D. Closeout Submittals: In accordance with Section 01 77 00, Closeout Procedures.
- E. Contractor-design Data (related to temporary construction):
 - 1. Written and graphic information.
 - 2. List of assumptions.
 - 3. List of performance and design criteria.
 - 4. Summary of loads or load diagram, if applicable.
 - 5. Calculations.
 - 6. List of applicable codes and regulations.
 - 7. Name and version of software.
 - 8. Information requested in individual specification section.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- F. Deferred Submittals: See Drawings for list of deferred submittals.
1. Contractor-design data related to permanent construction:
 - a. List of assumptions.
 - b. List of performance and design criteria.
 - c. Summary of loads or load diagram, if applicable.
 - d. Calculations.
 - e. List of applicable codes and regulations.
 - f. Name and version of design software.
 - g. Factory test results.
 - h. Informational submittals requested in individual specification section.
 2. Prior to installation of indicated structural or nonstructural element, equipment, distribution system, or component or its anchorage, submit calculations and test results of Contractor-designed components for review by Construction Manager and/or Engineer of Record. Documentation of review and indication of compliance with general design intent and project criteria provided on Construction Manager's comment form as meets conditions of the Contract, along with completed submittal, shall be filed with permitting agency by Contractor and approved by permitting agency prior to installation.
- G. Manufacturer's Instructions: Written or published information that documents manufacturer's recommendations, guidelines, and procedures in accordance with individual specification section.
- H. Operation and Maintenance Data: Provide for all Contractor-supplied equipment requiring Operational Instruction or routine maintenance.
- I. Payment: Payment submittals shall be in accordance with the General Conditions.
- J. Quality Control Documentation: As required in Section 01 45 16.13, Contractor Quality Control.
- K. Schedules:
1. Schedule of Submittals: The Schedule of Submittals, while is an Informational Submittal, shall include both Action Submittals and Informational Submittals. Prepare separately or in combination with Progress Schedule as specified in Section 01 32 16, Construction Progress Schedule.
 - a. The first Schedule of Submittals must be submitted at same time as the Baseline Schedule.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- b. Show for each, at a minimum, the following:
 - 1) Specification section number.
 - 2) Identification by numbering and tracking system as specified under Paragraph Transmittal of Submittal.
 - 3) Estimated date of submission to Construction Manager, including reviewing and processing time.
 - c. On a monthly basis, submit updated Schedule of Submittals to Construction Manager if changes have occurred or resubmittals are required.
 - 1) Progress Schedules: In accordance with Section 01 32 16, Construction Progress Schedule.
- L. Special Guarantee: Supplier's written guarantee as required in individual specification sections.
- M. Statement of Qualification: Evidence of qualification, certification, or registration as required in Contract Documents to verify qualifications of professional land surveyor, engineer, materials testing laboratory, specialty Subcontractor, trade, Specialist, consultant, installer, and other professionals.
- N. Submittals Required by Laws, Regulations, and Governing Agencies:
- 1. Promptly submit promptly notifications, reports, certifications, payrolls, and otherwise as may be required, directly to the applicable federal, state, or local governing agency or their representative.
 - 2. Transmit to Construction Manager for Owner's records one copy of correspondence and transmittals (to include enclosures and attachments) between Contractor and governing agency.
- O. Test, Evaluation, and Inspection Reports:
- 1. General: Shall contain signature of person responsible for test or report.
 - 2. Factory:
 - a. Identification of product and specification section, type of inspection or test with referenced standard or code.
 - b. Date of test, Project title and number, and name and signature of authorized person.
 - c. Test results.
 - d. If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.
 - e. Provide interpretation of test results, when requested by Construction Manager.
 - f. Other items as identified in individual specification sections.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3. Field:
 - a. As a minimum, include the following:
 - 1) Project title and number.
 - 2) Date and time.
 - 3) Record of temperature and weather conditions.
 - 4) Identification of product and specification section.
 - 5) Type and location of test, Sample, or inspection, including referenced standard or code.
 - 6) Date issued, testing laboratory name, address, and telephone number, and name and signature of laboratory inspector.
 - 7) If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.
 - 8) Provide interpretation of test results, when requested by Construction Manager.
 - 9) Other items as identified in individual specification sections.

- P. Training Data: In accordance with Section 01 43 33, Manufacturers' Field Services.

1.05 SUPPLEMENT

- A. The supplement listed below, following "End of Section," is part of this specification:

1. Transmittal of Contractor's Submittal.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

TRANSMITTAL OF CONTRACTOR'S SUBMITTAL (ATTACH TO EACH SUBMITTAL)			
DATE: _____			
TO: _____ _____ _____ _____ FROM: _____ <div style="text-align: center;">Contractor</div> _____ _____ _____	Submittal No.: _____ <input type="checkbox"/> New Submittal <input type="checkbox"/> Resubmittal Project: _____ Project No.: _____ Specification Section No.: _____ (Cover only one section with each transmittal) Schedule Date of Submittal: _____		
SUBMITTAL TYPE:	<input type="checkbox"/> Shop Drawing	<input type="checkbox"/> Sample	<input type="checkbox"/> Informational
	<input type="checkbox"/> Deferred		

The following items are hereby submitted:

Number of Copies	Description of Item Submitted (Type, Size, Model Number, Etc.)	Spec. and Para. No.	Drawing or Brochure Number	Contains Variation to Contract	
				No	Yes

Contractor hereby certifies that (i) Contractor has complied with the requirements of Contract Documents in preparation, review, and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws and regulations and governing agencies.

By: _____
Contractor (Authorized Signature)

SECTION 01 42 13
ABBREVIATIONS AND ACRONYMS

PART 1 GENERAL

1.01 REFERENCE TO STANDARDS AND SPECIFICATIONS OF TECHNICAL SOCIETIES

- A. Reference to standards and specifications of technical societies and reporting and resolving discrepancies associated therewith shall be as provided in the General Conditions, and as may otherwise be required herein and in the individual specification sections.
- B. Work specified by reference to published standard or specification of government agency, technical association, trade association, professional society or institute, testing agency, or other organization shall meet requirements or surpass minimum standards of quality for materials and workmanship established by designated standard or specification.
- C. Where so specified, products or workmanship shall also meet or exceed additional prescriptive, or performance requirements included within Contract Documents to establish a higher or more stringent standard of quality than required by referenced standard.
- D. Where two or more standards are specified to establish quality, product and workmanship shall meet or exceed requirements of most stringent.
- E. Where both a standard and a brand name are specified for a product in Contract Documents, proprietary product named shall meet or exceed requirements of specified reference standard.
- F. Copies of standards and specifications of technical societies:
 - 1. Copies of applicable referenced standards have not been bound in these Contract Documents.
 - 2. Where copies of standards are needed by Contractor, obtain a copy or copies directly from publication source and maintain in an orderly manner at the Site as Work Site records, available to Contractor's personnel, Subcontractors, Owner, Tenant and Construction Manager.
 - 3. All standards listed herein are not necessarily required for this Project. Refer to requirements in Specifications and Drawings for specific requirements of the Project.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

1.02 ABBREVIATIONS

A. Abbreviations for trade organizations and government agencies: Following is a list of construction industry organizations and government agencies to which references may be made in the Contract Documents, with abbreviations used.

1.	AA	Aluminum Association
2.	AABC	Associated Air Balance Council
3.	AAMA	American Architectural Manufacturers Association
4.	AASHTO	American Association of State Highway and Transportation Officials
5.	ABMA	American Bearing Manufacturers' Association
6.	ACI	American Concrete Institute
7.	AEIC	Association of Edison Illuminating Companies
8.	AGA	American Gas Association
9.	AGMA	American Gear Manufacturers' Association
10.	AI	Asphalt Institute
11.	AISC	American Institute of Steel Construction
12.	AISI	American Iron and Steel Institute
13.	AITC	American Institute of Timber Construction
14.	ALS	American Lumber Standards
15.	AMCA	Air Movement and Control Association
16.	ANSI	American National Standards Institute
17.	APA	APA – The Engineered Wood Association
18.	API	American Petroleum Institute
19.	APWA	American Public Works Association
20.	AHRI	Air-Conditioning, Heating, and Refrigeration Institute
21.	ASA	Acoustical Society of America
22.	ASABE	American Society of Agricultural and Biological Engineers
23.	ASCE	American Society of Civil Engineers
24.	ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
25.	ASME	American Society of Mechanical Engineers
26.	ASNT	American Society for Nondestructive Testing
27.	ASSE	American Society of Sanitary Engineering
28.	ASTM	ASTM International
29.	AWI	Architectural Woodwork Institute
30.	AWPA	American Wood Preservers' Association
31.	AWPI	American Wood Preservers' Institute
32.	AWS	American Welding Society
33.	AWWA	American Water Works Association

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

34.	BHMA	Builders Hardware Manufacturers' Association
35.	CBM	Certified Ballast Manufacturer
36.	CDA	Copper Development Association
37.	CGA	Compressed Gas Association
38.	CISPI	Cast Iron Soil Pipe Institute
39.	CMAA	Crane Manufacturers' Association of America
40.	CRSI	Concrete Reinforcing Steel Institute
41.	CS	Commercial Standard
42.	CSA	Canadian Standards Association
43.	CSI	Construction Specifications Institute
44.	DIN	Deutsches Institut für Normung e.V.
45.	DIPRA	Ductile Iron Pipe Research Association
46.	EIA	Electronic Industries Alliance
47.	EJCDC	Engineers Joint Contract Documents' Committee
48.	ETL	Electrical Test Laboratories
49.	FAA	Federal Aviation Administration
50.	FCC	Federal Communications Commission
51.	FDA	Food and Drug Administration
52.	FEMA	Federal Emergency Management Agency
53.	FIPS	Federal Information Processing Standards
54.	FM	FM Global
55.	Fed. Spec.	Federal Specifications (FAA Specifications)
56.	FS	Federal Specifications and Standards (Technical Specifications)
57.	GA	Gypsum Association
58.	GANA	Glass Association of North America
59.	HI	Hydraulic Institute
60.	HMI	Hoist Manufacturers' Institute
61.	IBC	International Building Code
62.	ICBO	International Conference of Building Officials
63.	ICC	International Code Council
64.	ICEA	Insulated Cable Engineers' Association
65.	IFC	International Fire Code
66.	IEEE	Institute of Electrical and Electronics Engineers, Inc.
67.	IESNA	Illuminating Engineering Society of North America
68.	IFI	Industrial Fasteners Institute
69.	IGMA	Insulating Glass Manufacturer's Alliance
70.	IMC	International Mechanical Code
71.	INDA	Association of the Nonwoven Fabrics Industry
72.	IPC	International Plumbing Code
73.	ISA	International Society of Automation

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

74.	ISO	International Organization for Standardization
75.	ITL	Independent Testing Laboratory
76.	JIC	Joint Industry Conferences of Hydraulic Manufacturers
77.	MIA	Marble Institute of America
78.	MIL	Military Specifications
79.	MMA	Monorail Manufacturers' Association
80.	MSS	Manufacturer's Standardization Society
81.	NAAMM	National Association of Architectural Metal Manufacturers
82.	NACE	NACE International
83.	NBGQA	National Building Granite Quarries Association
84.	NEBB	National Environmental Balancing Bureau
85.	NEC	National Electrical Code
86.	NECA	National Electrical Contractor's Association
87.	NEMA	National Electrical Manufacturers' Association
88.	NESC	National Electrical Safety Code
89.	NETA	InterNational Electrical Testing Association
90.	NFPA	National Fire Protection Association
91.	NHLA	National Hardwood Lumber Association
92.	NICET	National Institute for Certification in Engineering Technologies
93.	NIST	National Institute of Standards and Technology
94.	NRCA	National Roofing Contractors Association
95.	NRTL	Nationally Recognized Testing Laboratories
96.	NSF	NSF International
97.	NSPE	National Society of Professional Engineers
98.	NTMA	National Terrazzo and Mosaic Association
99.	NWWDA	National Wood Window and Door Association
100.	OSHA	Occupational Safety and Health Act (both Federal and State)
101.	PCI	Precast/Prestressed Concrete Institute
102.	PEI	Porcelain Enamel Institute
103.	PPI	Plastic Pipe Institute
104.	PS	Product Standards Section-U.S. Department of Commerce
105.	RMA	Rubber Manufacturers' Association
106.	RUS	Rural Utilities Service
107.	SAE	SAE International
108.	SDI	Steel Deck Institute
109.	SDI	Steel Door Institute
110.	SJI	Steel Joist Institute
111.	SMACNA	Sheet Metal and Air Conditioning Contractors National Association

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

112. SPI	Society of the Plastics Industry
113. SSPC	The Society for Protective Coatings
114. STI/SPFA	Steel Tank Institute/Steel Plate Fabricators Association
115. SWI	Steel Window Institute
116. TEMA	Tubular Exchanger Manufacturers' Association
117. TCA	Tile Council of North America
118. TIA	Telecommunications Industry Association
119. UBC	Uniform Building Code
120. UFC	Uniform Fire Code
121. UL	formerly Underwriters Laboratories Inc.
122. UMC	Uniform Mechanical Code
123. USBR	U.S. Bureau of Reclamation
124. WCLIB	West Coast Lumber Inspection Bureau
125. WI	Wood Institute
126. WWPA	Western Wood Products Association

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 43 33
MANUFACTURERS' FIELD SERVICES

PART 1 GENERAL

1.01 DEFINITIONS

- A. Person-Day: One person for 8 hours within regular Contractor working hours.

1.02 SUBMITTALS

- A. Informational Submittals:
1. Training Schedule: Submit, in accordance with requirements of this Specification, not less than 21 days prior to start of equipment installation and revise as necessary for acceptance.
 2. Lesson Plan: Submit, in accordance with requirements of this Specification, proposed lesson plan not less than 21 days prior to scheduled training and revise as necessary for acceptance.

1.03 QUALIFICATION OF MANUFACTURER'S REPRESENTATIVE

- A. Authorized representative of the manufacturer, factory trained, and experienced in the technical applications, installation, operation, and maintenance of respective equipment, subsystem, or system, with full authority by the equipment manufacturer to issue the certifications required of the manufacturer. Additional qualifications may be specified in the individual specification section.
- B. Representative subject to acceptance by Construction Manager. No substitute representatives will be allowed unless prior written approval by such has been given.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 FULFILLMENT OF SPECIFIED MINIMUM SERVICES

- A. Furnish manufacturers' services, when required by an individual specification section, to meet the requirements of this section.
- B. Where time is necessary in excess of that stated in the Specifications for manufacturers' services, or when a minimum time is not specified, time required to perform specified services shall be considered incidental.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- C. Schedule manufacturer's services to avoid conflict with other onsite testing or other manufacturers' onsite services.
- D. Determine, before scheduling services, that conditions necessary to allow successful testing have been met.
- E. Only those days of service approved by Construction Manager will be credited to fulfill specified minimum services.
- F. When specified in individual specification sections, manufacturer's onsite services shall include:
 - 1. Assistance during product (system, subsystem, or component) installation to include observation, guidance, instruction of Contractor's assembly, erection, installation or application procedures.
 - 2. Inspection, checking, and adjustment as required for product (system, subsystem, or component) to function as warranted by manufacturer and necessary to furnish Manufacturer's Certificate of Proper Installation.
 - 3. Providing, on a daily basis, copies of manufacturers' representatives field notes and data to Construction Manager.
 - 4. Revisiting the Site as required to correct problems and until installation and operation are acceptable to Construction Manager.
 - 5. Resolution of assembly or installation problems attributable to or associated with respective manufacturer's products and systems.
 - 6. Assistance during functional and performance testing, and facility startup and evaluation.
 - 7. Training of Owner's personnel in the operation and maintenance of respective product as required.

3.02 MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

- A. When so specified, a Manufacturer's Certificate of Proper Installation form, a copy of which is attached to this section, shall be completed and signed by equipment manufacturer's representative.
- B. Such form shall certify signing party is a duly authorized representative of manufacturer, is empowered by manufacturer to inspect, approve, and operate their equipment and is authorized to make recommendations required to ensure equipment is complete and operational.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3.03 TRAINING

A. General:

1. Furnish manufacturers' representatives for detailed classroom and hands-on training to Owner's personnel on operation and maintenance of specified product (system, subsystem, component) and as may be required in applicable Specifications.
2. Furnish trained, articulate personnel to coordinate and expedite training, to be present during training coordination meetings with Owner, and familiar with operation and maintenance manual information.
3. Manufacturer's representative shall be familiar with facility operation and maintenance requirements as well as with specified equipment.
4. Furnish complete training materials, to include operation and maintenance data, to be retained by each trainee.

B. Training Schedule:

1. List specified equipment and systems that require training services and show:
 - a. Respective manufacturer.
 - b. Estimated dates for installation completion.
 - c. Estimated training dates.
2. Allow for multiple sessions when several shifts are involved.
3. Adjust schedule to ensure training of appropriate personnel as deemed necessary by Owner, and to allow full participation by manufacturers' representatives. Adjust schedule for interruptions in operability of equipment.
4. Coordinate with Section 01 32 16, Construction Progress Schedule.

C. Lesson Plan:

1. When manufacturer or vendor training of Owner personnel is specified, prepare a lesson plan for each required course containing the following minimum information:
 - a. Title and objectives.
 - b. Recommended attendees (such as, managers, engineers, operators, maintenance).
 - c. Course description, outline of course content, and estimated class duration.
 - d. Format (such as, lecture, self-study, demonstration, hands-on).
 - e. Instruction materials and equipment requirements.
 - f. Resumes of instructors providing training.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

D. Prestartup Training:

1. Coordinate training sessions with Owner's operating personnel and manufacturers' representatives.
2. Post-startup Training: If Complete at least 14 days prior to beginning of facility startup.

E. As required in Specifications, furnish and coordinate training of Owner's operating personnel by respective manufacturer's representatives.

3.04 SUPPLEMENT

A. The supplement listed below, following "End of Section," is a part of this specification:

1. Manufacturer's Certificate of Proper Installation.

END OF SECTION

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

OWNER _____ EQPT SERIAL NO: _____

EQPT TAG NO: _____ EQPT/SYSTEM: _____

PROJECT NO: _____ SPEC. SECTION: _____

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

- Installed in accordance with Manufacturer's recommendations.
- Inspected, checked, and adjusted.
- Serviced with proper initial lubricants.
- Electrical and mechanical connections meet quality and safety standards.
- All applicable safety equipment has been properly installed.
- Functional tests.
- System has been performance tested and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Note: Attach any performance test documentation from manufacturer.

Comments: _____

I, the undersigned Manufacturer's Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate their equipment and (iii) authorized to make recommendations required to ensure equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____, 20____

Manufacturer: _____

By Manufacturer's Authorized Representative: _____

(Authorized Signature)

SECTION 01 45 16.13
CONTRACTOR QUALITY CONTROL

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):
 - a. D3740, Evaluation of Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
 - b. E329, Use in the Evaluation of Testing and Inspection Agencies as Used in Construction.

1.02 DEFINITIONS

A. Contractor Quality Control (CQC): The means by which Contractor ensures that the construction, to include that performed by subcontractors and suppliers, complies with the requirements of the Contract.

1.03 SUBMITTALS

A. Informational Submittals:

1. CQC Plan: Submit, not later than 15 days after receipt of Notice to Proceed.
2. CQC Report: Submit, weekly, an original and one copy in report form.

1.04 OWNER'S QUALITY ASSURANCE

A. All Work is subject to Construction Manager's quality assurance inspection and testing at all locations and at all reasonable times before acceptance to ensure strict compliance with the terms of the Contract Documents.

B. Construction Manager's quality assurance inspections and tests are for the sole benefit of Owner and do not:

1. Relieve Contractor of responsibility for providing adequate quality control measures;
2. Relieve Contractor of responsibility for damage to or loss of the material before acceptance;

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3. Constitute or imply acceptance; or
 4. Affect the continuing rights of Owner after acceptance of the completed Work.
- C. The presence or absence of a quality assurance inspector does not relieve Contractor from any Contract requirement.
- D. Promptly furnish all facilities, labor, and material reasonably needed for performing such safe and convenient inspections and tests as may be required by Construction Manager.
- E. Owner may charge Contractor for any additional cost of inspection or test when Work is not ready at the time specified by Contractor for inspection or test, or when prior rejection makes re-inspection or retest necessary. Quality assurance inspections and tests will be performed in a manner that will not unnecessarily delay the Work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

- A. Contractor shall maintain an adequate inspection system and perform such inspections as will ensure that the Work conforms to the Contract Documents.
- B. Contractor shall maintain complete inspection records and make them available at all times to Owner and Construction Manager.
- C. The quality control system shall consist of plans, procedures, and organization necessary to produce an end-product that complies with the Contract Documents. The system shall cover all construction and demolition operations, both onsite and offsite, including Work by subcontractors, fabricators, suppliers and purchasing agents, and shall be keyed to the proposed construction sequence.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3.02 COORDINATION MEETING

- A. After the Preconstruction Conference, but before start of construction, and prior to acceptance of the CQC Plan, schedule a meeting with Construction Manager and Owner to discuss the quality control system.
- B. Develop a mutual understanding of the system details, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite Work, and the interrelationship of Contractor's management and control with the Construction Manager's Quality Assurance.
- C. There may be occasions when subsequent conferences may be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures that may require corrective action by Contractor.

3.03 QUALITY CONTROL ORGANIZATION

- A. CQC System Manager:
 - 1. Designate an individual within Contractor's organization who will be responsible for overall management of CQC and have the authority to act in CQC matters for the Contractor.
 - 2. CQC System Manager may not perform other duties on the Project.
 - 3. CQC System Manager shall be an experienced construction person, with a minimum of 3 years construction experience on similar type Work.
 - 4. CQC System Manager shall report to the Contractor's project manager or someone higher in the organization. Project manager in this context shall mean the individual with responsibility for the overall quality and production management of the Project.
 - 5. CQC System Manager shall be onsite during construction; periods of absence may not exceed 2 weeks at any one time.
 - 6. Identify an alternate for CQC System Manager to serve with full authority during the System Manager's absence. The requirements for the alternate will be the same as for designated CQC System Manager.
- B. CQC Staff:
 - 1. Designate CQC staff, available at the Site at all times during progress, with complete authority to take any action necessary to ensure compliance with the Contract. CQC staff members shall be subject to acceptance by Construction Manager.
 - 2. CQC staff shall take direction from CQC System Manager in matters pertaining to QC.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3. CQC staff must be of sufficient size to ensure adequate QC coverage of Work phases, work shifts, and work crews involved in the construction. These personnel may perform other duties, but must be fully qualified by experience and technical training to perform their assigned QC responsibilities and must be allowed sufficient time to carry out these responsibilities.
 4. The actual strength of the CQC staff may vary during any specific Work period to cover the needs of the Project. Add additional staff when necessary for a proper CQC organization.
- C. Organizational Changes: Obtain Construction Manager's acceptance before replacing any member of the CQC staff. Requests for changes shall include name, qualifications, duties, and responsibilities of the proposed replacement.

3.04 QUALITY CONTROL PHASING

- A. CQC shall include at least three phases of control to be conducted by CQC System Manager for all definable features of Work, as follows:
1. Preparatory Phase:
 - a. Notify Construction Manager at least 48 hours in advance of beginning any of the required action of the preparatory phase.
 - b. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The CQC System Manager shall instruct applicable CQC staff as to the acceptable level of workmanship required in order to meet Contract requirements.
 - c. Document the results of the preparatory phase meeting by separate minutes prepared by the CQC System Manager and attached to the QC report.
 - d. Perform prior to beginning Work on each definable feature of Work:
 - 1) Review applicable Contract Specifications.
 - 2) Review applicable Contract Drawings.
 - 3) Verify that all materials and/or equipment have been tested, submitted, and approved.
 - 4) Verify that provisions have been made to provide required control inspection and testing.
 - 5) Examine the Work area to verify that all required preliminary Work has been completed and is in compliance with the Contract.
 - 6) Perform a physical examination of required materials, equipment, and sample Work to verify that they are on

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- hand, conform to approved Shop Drawing or submitted data, and are properly stored.
- 7) Review the appropriate activity hazard analysis to verify safety requirements are met.
 - 8) Review procedures for constructing the Work, including repetitive deficiencies.
 - 9) Document construction tolerances and workmanship standards for that phase of the Work.
 - 10) Check to verify that the plan for the Work to be performed, if so required, has been accepted by Construction Manager.
2. Initial Phase:
- a. Accomplish at the beginning of a definable feature of Work:
 - 1) Notify Owner and Construction Manager at least 48 hours in advance of beginning the initial phase.
 - 2) Perform prior to beginning Work on each definable feature of Work:
 - a) Review minutes of the preparatory meeting.
 - b) Check preliminary Work to verify compliance with Contract requirements.
 - c) Verify required control inspection and testing.
 - d) Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Comparison with sample panels is appropriate.
 - e) Resolve all differences.
 - f) Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.
 - 3) Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the QC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.
 - 4) The initial phase should be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.
3. Follow-up Phase:
- a. Perform daily checks to verify continuing compliance with Contract requirements, including control testing, until completion of the particular feature of Work.
 - b. Daily checks shall be made a matter of record in the CQC documentation and shall document specific results of inspections for all features of Work for the day or shift.
 - c. Conduct final follow-up checks and correct all deficiencies prior to the start of additional features of Work that will be affected by

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- the deficient Work. Constructing upon or concealing nonconforming Work will not be allowed.
4. Additional Preparatory and Initial Phases: Additional preparatory and initial phases may be conducted on the same definable features of Work as determined by Construction Manager if the quality of ongoing Work is unacceptable; or if there are changes in the applicable QC staff or in the onsite production supervision or work crew; or if work on a definable feature is resumed after a substantial period of inactivity, or if other problems develop.

3.05 CONTRACTOR QUALITY CONTROL PLAN

A. General:

1. Plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used.
2. An interim plan for the first 30 days of operation will be considered.
3. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of Work to be started.
4. Work outside of the features of Work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of Work to be started.

B. Content:

1. Plan shall cover the intended CQC organization for the entire Contract and shall include the following, as a minimum:
 - a. Organization: Description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff will implement the three-phase control system (see Paragraph Quality Control Phasing) for all aspects of the Work specified.
 - b. CQC Staff: The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a QC function.
 - c. Letters of Authority: A copy of a letter to the CQC System Manager signed by an authorized official of the firm, describing the responsibilities and delegating sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop Work which is not in compliance with the Contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- outlining duties, authorities and responsibilities. Copies of these letters will also be furnished to Owner.
- d. Submittals: Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers and purchasing agents.
 - e. Testing: Control, verification and acceptance testing procedures for each specific test to include the test name, frequency, specification paragraph containing the test requirements, the personnel and laboratory responsible for each type of test, and an estimate of the number of tests required.
 - f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests, including documentation.
 - g. Procedures for tracking deficiencies from identification through acceptable corrective action. These procedures will establish verification that identified deficiencies have been corrected.
 - h. Reporting procedures, including proposed reporting formats; include a copy of the CQC report form.
- C. Acceptance of Plans: Acceptance of the Contractor's basic and addendum CQC plans is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. Owner reserves the right to require Contractor to make changes in the CQC plan and operations including removal of personnel, as necessary, to obtain the quality specified.
- D. Notification of Changes: After acceptance of the CQC plan, Contractor shall notify Construction Manager, in writing, a minimum of 7 calendar days prior to any proposed change. Proposed changes are subject to acceptance by Construction Manager.

3.06 CONTRACTOR QUALITY CONTROL REPORT

- A. As a minimum, prepare a CQC report for every 7 calendar days. Account for all days throughout the life of the Contract. Reports shall be signed and dated by CQC System Manager. Include copies of test reports and copies of reports prepared by QC staff.
- B. Maintain current records of quality control operations, activities, and tests performed, including the Work of subcontractors and suppliers.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- C. Records shall be on an acceptable form and shall be a complete description of inspections, the results of inspections, daily activities, tests, and other items, including but not limited to the following:
1. Contractor/subcontractor and their areas of responsibility.
 2. Operating plant/equipment with hours worked, idle, or down for repair.
 3. Work performed today, giving location, description, and by whom. When a network schedule is used, identify each phase of Work performed each day by activity number.
 4. Test and/or control activities performed with results and references to specifications/plan requirements. The control phase should be identified (Preparatory, Initial, Follow-up). List deficiencies noted along with corrective action.
 5. Material received with statement as to its acceptability and storage.
 6. Identify submittals reviewed, with Contract reference, by whom, and action taken.
 7. Offsite surveillance activities, including actions taken.
 8. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
 9. List instructions given/received and conflicts in Drawings and/or Specifications.
 10. Contractor's verification statement.
 11. Indicate a description of trades working on the Project; the number of personnel working; weather conditions encountered; and any delays encountered.
 12. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in file work and workmanship comply with the Contract.

3.07 SUBMITTAL QUALITY CONTROL

- A. Submittals shall be as specified in Section 01 33 00, Submittal Procedures. The CQC organization shall be responsible for certifying that all submittals are in compliance with the Contract requirements. Construction Manager will furnish copies of test report forms upon request by Contractor. Contractor may use other forms if approved by Construction Manager.

3.08 TESTING QUALITY CONTROL

- A. Testing Procedure:
1. Perform tests specified or required to verify that control measures are adequate to provide a product which conforms to Contract requirements.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

Procure services of a licensed testing laboratory. Perform the following activities and record the following data:

- a. Verify testing procedures comply with contract requirements.
- b. Verify facilities and testing equipment are available and comply with testing standards.
- c. Check test instrument calibration data against certified standards.
- d. Verify recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
- e. Documentation:
 - 1) Record results of all tests taken, both passing and failing, on the CQC report for the date taken.
 - 2) Include specification paragraph reference, location where tests were taken, and the sequential control number identifying the test.
 - 3) Actual test reports may be submitted later, if approved by Construction Manager, with a reference to the test number and date taken.
 - 4) Provide directly to Construction Manager an information copy of tests performed by an offsite or commercial test facility. Test results shall be signed by an engineer registered in the state where the tests are performed.
 - 5) Failure to submit timely test reports, as stated, may result in nonpayment for related Work performed and disapproval of the test facility for this Contract.

- B. Testing Laboratories: Laboratory facilities, including personnel and equipment, utilized for testing soils, concrete, asphalt and steel shall meet criteria detailed in ASTM D3740 and ASTM E329, and be accredited by the American Association of Laboratory Accreditation (AALA), National Institute of Standards and Technology (NIST), National Voluntary Laboratory Accreditation Program (NVLAP), the American Association of State Highway and Transportation Officials (AASHTO), or other approved national accreditation authority. Personnel performing concrete testing shall be certified by the American Concrete Institute (ACI).

3.09 COMPLETION INSPECTION

- A. CQC System Manager shall conduct an inspection of the Work at the completion of all Work or any milestone established by a completion time stated in the Contract.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

B. Punchlist:

1. CQC System Manager shall develop a punchlist of items which do not conform to the Contract requirements.
2. Include punchlist in the CQC report, indicating the estimated date by which the deficiencies will be corrected.
3. CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected and so notify the Construction Manager.
4. These inspections and any deficiency corrections required will be accomplished within the time stated for completion of the entire Work or any particular increment thereof if the Project is divided into increments by separate completion dates.

END OF SECTION

SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Association of Nurserymen (AAN): American Standards for Nursery Stock.
 2. Federal Emergency Management Agency (FEMA).
 3. National Fire Prevention Association (NFPA): 241, Standard for Safeguarding Construction, Alteration, and Demolition Operations.
 4. Telecommunications Industry Association (TIA); Electronic Industries Alliance (EIA): 568B, Commercial Building Telecommunications Cabling Standard.
 5. U.S. Department of Agriculture (USDA): Urban Hydrology for Small Watersheds.
 6. U.S. Weather Bureau: Rainfall-Frequency Atlas of the U.S. for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years.

1.02 SUBMITTALS

- A. Informational Submittals:
1. Copies of permits and approvals for construction as required by Laws and Regulations and governing agencies.
 2. Temporary Utility Submittals:
 - a. Electric power supply and distribution plans.
 - b. Water supply and distribution plans.
 3. Temporary Construction Submittals:
 - a. Access Roads: Routes, cross-sections, and drainage facilities.
 - b. Contractor's field office, storage yard, and storage building plans, including gravel surfaced area. Contractor shall provide information on service hookups and coordinate with Owner.
 - c. Fencing and protective barrier locations and details.
 - d. Contractor laydown location and layout plan.
 - e. Traffic and Pedestrian Control and Routing Plans: As specified herein, and proposed revisions thereto.
 4. Temporary Control Submittals:
 - a. Dust control plan.
 - b. Plan for disposal of waste materials and intended haul routes.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

1.03 MOBILIZATION

- A. Mobilization includes, but is not limited to, these principal items:
 - 1. Obtaining required permits.
 - 2. Moving Contractor's field office and equipment required for first month operations onto Site.
 - 3. Installing temporary construction power, wiring, and lighting facilities.
 - 4. Providing onsite Internet service.
 - 5. Providing onsite sanitary facilities and potable water facilities as specified and as required by Laws and Regulations, and governing agencies.
 - 6. Arranging for and erection of Contractor's work and storage yard.
 - 7. Posting OSHA required notices and establishing safety programs and procedures.
 - 8. Having Contractor's superintendent at Site full time.
- B. Use area designated for Contractor's temporary facilities as shown on the Drawings.
- C. No more than half of Schedule of Values mobilization line item will be approved.

1.04 PROTECTION OF WORK AND PROPERTY

- A. Comply with Owner's safety rules while on Owner's property.
- B. Keep Construction Manager informed of serious onsite accidents and related claims.
- C. Use of Explosives: No blasting or use of explosives will be allowed onsite.

1.05 VEHICULAR TRAFFIC

- A. Traffic Control Plan: Adhere to traffic control plan reviewed and accepted by Construction Manager. Changes to this plan shall be made only by written approval of Construction Manager. Secure approvals for necessary changes so as not to delay progress of the Work.
- B. Traffic Routing Plan: Show sequences of construction affecting use of roadways, time required for each phase of the Work, provisions for decking over excavations and phasing of operations to provide necessary access, and plans for signing, barricading, and striping to provide passages for pedestrians and vehicles. Refer to the Drawings for site access route.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- C. Drainage Swales: Under no circumstances shall vehicles of any type drive on the grassy swales within or on the perimeter of the Terminal.

PART 2 PRODUCTS

2.01 CONSTRUCTION MANAGER'S FIELD OFFICES

- A. The Owner will provide the Construction Manager with field office space.
- B. The Contractor is not required to provide field offices for the Construction Manager.

2.02 CONTRACTOR'S FIELD OFFICES

- A. Should the Contractor require a field office this shall be a modular building located within the Contractor's laydown area.
- B. Contractor shall provide own equipment and furniture for the Project.
- C. Ownership of equipment and furniture furnished under this article will remain, unless otherwise specified, that of Contractor.
- D. Equipment furnished shall be new or like new in appearance and function.
- E. Computer Hardware: Provide computers and accessories necessary to efficiently perform the work in the Contract.

PART 3 EXECUTION

3.01 CONTRACTOR'S FIELD OFFICE

- A. Locate where directed by Drawings and Specifications; level, block, tie down, skirt, provide stairways, and relocate when necessary and approved. Construct on proper foundations, and provide proper surface drainage and connections for utility services.
- B. Provide sanitary facilities in compliance with state and local health authorities.
- C. Maintain in good repair and appearance, and provide weekly cleaning service and replenishment, as required, of paper towels, paper cups, hand soap, toilet paper, first-aid kit supplies, and bottled water.
- D. Replenish, as needed, copy paper and toner.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3.02 TEMPORARY UTILITIES

A. Power:

1. Electric power will be available at Site.
2. Determine type and amount available and make arrangements for obtaining temporary electric power service.
3. Cost of electric power will be borne by Owner.

B. Lighting: Provide temporary lighting to meet applicable safety requirements to allow erection, application, or installation of materials and equipment, and observation or inspection of the Work.

C. Heating, Cooling, and Ventilating:

1. Provide as required to maintain adequate environmental conditions to facilitate progress of the Work, to meet specified minimum conditions for installation of materials, and to protect materials, equipment, and finishes from damage because of temperature or humidity.
2. Provide adequate forced air ventilation of enclosed areas to cure installed materials, to dispense humidity, and to prevent hazardous accumulations of dust, fumes, vapors, or gases.
3. Pay costs of installation, maintenance, operation, removal, and fuel consumed.
4. Provide portable unit heaters, complete with controls, oil- or gas-fired, and suitably vented to outside as required for protection of health and property.
5. If permanent natural gas piping is used for temporary heating units, do not modify or reroute gas piping without approval of utility company. Provide separate gas metering as required by utility.

D. Water:

1. Hydrant Water:
 - a. Is available from nearby hydrants. Coordinate with Owner for access. Costs of site water from Hydrants will be borne by Owner.
 - b. Hydrant water is suitable for construction and sanitary needs, but should not be considered potable.
 - c. Use only special hydrant-operating wrenches to open hydrants. Make certain hydrant valve is open full, since cracking valve causes damage to hydrant. Repair damaged hydrants and notify appropriate agency as quickly as possible. Hydrants shall be completely accessible to fire department at all times.
 - d. Include costs to connect and transport water to construction areas in Contract Price.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

2. Provide temporary facilities and piping required to bring water to point of use and remove when no longer needed.
 3. Provide means to prevent water used for testing from flowing back into source pipeline (backflow preventer).
- E. Sanitary and Personnel Facilities:
1. Provide and maintain facilities for Contractor's employees, Subcontractors, and other onsite employers' employees. Service, clean, and maintain facilities and enclosures.
 2. Use of Owner's or Tenants' existing sanitary facilities by construction personnel will not be allowed.
- F. Fire Protection: Furnish and maintain on Site adequate firefighting equipment capable of extinguishing incipient fires. Comply with applicable parts of NFPA 241.

3.03 PROTECTION OF WORK AND PROPERTY

- A. General:
1. Perform Work within right-of-way and easements in a systematic manner that minimizes inconvenience to property owners and the public.
 2. No Owner's or Tenants' activities or operations shall be cut off from vehicular traffic, unless special arrangements have been made.
 3. Maintain in continuous service existing oil and gas pipelines, underground power, telephone or communication cable, water mains, irrigation lines, sewers, poles and overhead power, and other utilities encountered along line of the Work, unless other arrangements satisfactory to users of said utilities have been made.
 4. Where completion of the Work requires temporary or permanent removal or relocation of existing utility, coordinate activities with user of said utility and perform work to their satisfaction.
 5. Protect, shore, brace, support, and maintain underground pipes, conduits, drains, and other underground utility construction uncovered or otherwise affected by construction operations.
 6. Keep fire hydrants and water control valves free from obstruction and available for use at all times.
 7. In areas where Contractor's operations are adjacent to or near a utility, such as gas, telephone, television, electric power, water, sewer, or irrigation system, and such operations may cause damage or inconvenience, suspend operations until arrangements necessary for protection have been made by Contractor.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

8. Notify Owner and Tenants and utility offices that may be affected by construction operation at least 2 days in advance: Before exposing a utility, obtain utility owner's permission. Should service of utility be interrupted due to Contractor's operation, notify proper authority immediately. Cooperate with said authority in restoring service as promptly as possible and bear costs incurred.
 9. Do not impair operation of existing sewer system. Prevent construction material, pavement, concrete, earth, volatile and corrosive wastes, and other debris from entering sewers, pump stations, or other sewer structures.
 10. Maintain original Site drainage wherever possible.
- B. Site Security: Provide and maintain additional temporary security fences as necessary to protect the Work and Contractor-furnished products not yet installed.
- C. Barricades and Lights:
1. Provide as required to isolate work areas and in sufficient quantity to safeguard public (terminal employees) and the Work.
 2. Provide as necessary to prevent unauthorized entry to construction areas and affected roads, streets, and alleyways, inside and outside of fenced area, and as required to ensure public safety and the safety of Contractor's employees, other employer's employees, and others who may be affected by the Work.
 3. Provide to protect existing facilities and adjacent properties, including swales, from potential damage.
 4. Locate to enable access by facility operators and property owners.
 5. Protect streets, roads, highways, and other public thoroughfares that are closed to traffic by effective barricades with acceptable warning signs.
 6. Locate barricades at the nearest intersecting public thoroughfare on each side of blocked section.
 7. Illuminate barricades and obstructions with warning lights from sunset to sunrise.
- D. Signs and Equipment:
1. Traffic Cones: Provide to delineate traffic lanes to guide and separate traffic movements.
 2. Provide appropriate signage at obstructions, such as material piles and equipment.
 3. Use to alert terminal personnel and general public of construction hazards, which would include surface irregularities, unramped

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

walkways, grade changes, and trenches or excavations in roadways and in other public access areas.

E. Existing Structures:

1. Where Contractor contemplates removal of small structures such as signposts, and culverts that interfere with Contractor's operations, obtain approval of JAXPORT and Construction Manager.
2. Replace items removed in their original location and a condition equal to or better than original.

F. Finished Construction: Protect finished construction at all times.

G. Waterways: Keep river, swales, ditches, culverts, and natural drainages continuously free of construction materials and debris.

H. Dewatering: Construct, maintain, and operate cofferdams, channels, flume drains, sumps, pumps, or other temporary diversion and protection works. Furnish materials required, install, maintain, and operate necessary pumping and other equipment for the environmentally safe removal and disposal of water from the various parts of the Work. Maintain foundations and parts of the Work free from water.

3.04 TEMPORARY CONTROLS

A. Air Pollution Control:

1. Minimize air pollution from construction operations.
2. Burning of waste materials, rubbish, or other debris will not be permitted on or adjacent to Site.
3. Conduct operations of dumping rock and of carrying rock away in trucks to cause a minimum of dust. Give unpaved phases, areas, streets, roads, detours, or haul roads used in construction area a dust-preventive treatment or periodically water to prevent dust. Strictly adhere to applicable environmental regulations for dust prevention.
4. Contractor shall be responsible for complying with environmental regulations, and shall follow instructions from the Construction Manager should air pollution be an issue.

B. Water Pollution Control:

1. Divert sanitary sewage and nonstorm waste flow interfering with construction and requiring diversion to sanitary sewers. Do not cause or permit action to occur which would cause an overflow to existing waterway.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

2. Prior to commencing excavation and construction, obtain Construction Manager's agreement with detailed plans showing procedures intended to handle and dispose of sewage, groundwater, and dewatering pump discharges.
 3. Comply with Section 01 57 13, Temporary Erosion and Sediment Control, for stormwater flow and surface runoff.
 4. Do not dispose of volatile wastes such as mineral spirits, oil, chemicals, or paint thinner in storm or sanitary drains. Disposal of wastes into streams or waterways is prohibited. Provide acceptable containers for collection and disposal of waste materials, debris, and rubbish.
- C. Erosion, Sediment, and Flood Control: Provide, maintain, and operate temporary facilities as specified in Section 01 57 13, Temporary Erosion and Sediment Control, to control erosion and sediment releases, and to protect the Work and existing facilities from flooding during construction period.

3.05 STORAGE YARDS AND BUILDINGS

- A. Temporary Storage Yards: Construct temporary storage yards for storage of products that are not subject to damage by weather conditions.
- B. Temporary Storage Buildings:
1. Provide environmental control systems that meet recommendations of manufacturers of equipment and materials stored.
 2. Arrange or partition to provide security of contents and ready access for inspection and inventory.
 3. Store combustible materials (paints, solvents, fuels) in a well-ventilated and remote building meeting safety standards.

3.06 ACCESS ROADS AND DETOURS

- A. Use existing roads where shown on the Drawings. Alignments for new routes shall be approved by Owner and Construction Manager.
- B. Maintain drainage ways. Install and maintain culverts to allow water to flow beneath access roads. Provide corrosion-resistant culvert pipe of adequate strength to resist construction loads.
- C. Maintain road grade and crown to eliminate potholes, rutting, and other irregularities that restrict access.
- D. Swales may not be used for vehicular traffic or access routes at any time.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- E. Upon completion of construction, restore ground surface and asphalt pavement disturbed by access road construction to original grade. Replace damaged or broken culverts with new culvert pipe of same diameter and material.

3.07 PARKING AREAS

- A. Control vehicular parking to preclude interference with public or terminal traffic or parking, access by emergency vehicles, Owner's operations, or construction operations.
- B. Provide parking facilities for personnel working on Project. No employee or equipment parking will be permitted on Owner's existing paved areas, except as specifically designated for Contractor's use on the Drawings.
- C. Use area designated on the Drawings for parking of Contractor's and Contractor's employees' vehicles.
- D. Swales may not be used for parking at any time.

3.08 VEHICULAR TRAFFIC

- A. Comply with Laws and Regulations regarding closing or restricting use of public streets or highways. No public or private road shall be closed, except by written permission of proper authority. Ensure the least possible obstruction to traffic and normal commercial pursuits.
- B. Conduct the Work to interfere as little as possible with public travel or movements within Blount Island Marine Terminal, whether vehicular or pedestrian.
- C. Whenever it is necessary to cross, close, or obstruct roads, driveways, and walks, whether public or private, provide and maintain suitable and safe bridges, detours, or other temporary expedients for accommodation of public and private travel.
- D. Do not use vehicular traffic on swales.
- E. Road Closures: Maintain satisfactory means of exit for persons residing or having occasion to transact business along route of the Work. If it is necessary to close off roadway or alley providing sole vehicular access to property for periods greater than 2 hours, provide written notice to each owner so affected 3 days prior to such closure. In such cases, closings of up to 4 hours may be allowed. Closures of up to 10 hours may be allowed if a week's written notice is given and undue hardship does not result.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- F. Maintenance of traffic is not required if Contractor obtains written permission from Owner, or from authority having jurisdiction over public property involved, to obstruct traffic at designated point. Contractor will not be permitted to enter Tenant's areas.
- G. In making street crossings, do not block more than one-half the street at a time. Whenever possible, widen shoulder on opposite side to facilitate traffic flow. Provide temporary surfacing on shoulders as necessary.
- H. Maintain top of backfilled trenches before they are paved, to allow normal vehicular traffic to pass over. Provide temporary access driveways where required. Cleanup operations shall follow immediately behind backfilling.
- I. When flaggers and guards are required by regulation or when deemed necessary for safety, furnish them with approved orange wearing apparel and other regulation traffic control devices.
- J. Notify fire department and police department before closing street or portion thereof. Notify said departments when streets are again passable for emergency vehicles. Do not block off emergency vehicle access to consecutive arterial crossings or dead-end streets, in excess of 300 linear feet, without written permission from fire department. Conduct operations with the least interference to fire equipment access, and at no time prevent such access. Furnish Contractor's night emergency telephone numbers to police department.
- K. Coordinate traffic routing with that of others working in same or adjacent areas.

3.09 CLEANING DURING CONSTRUCTION

- A. In accordance with General Conditions, as may be specified in other Specification sections, and as required herein.
- B. Wet down exterior surfaces prior to sweeping to prevent blowing of dust and debris. At least weekly, sweep floors (basins, tunnels, platforms, walkways, roof surfaces), and pick up and dispose of debris.
- C. Provide approved containers for collection and disposal of waste materials, debris, and rubbish. At least weekly, dispose of such waste materials, debris, and rubbish offsite.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- D. At least weekly, brush sweep entry drive, roadways, and other streets and walkways affected by the Work and where adjacent to the Work.
- E. Should swales be damaged due to construction activities, or for any reason attributable to the Contractor, the swales shall be repaired in accordance with instructions from the Construction Manager, and to the satisfaction of the Owner. All repairs to swales shall be at the Contractor's cost.

END OF SECTION

SECTION 01 57 13
TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.01 SUMMARY

- A. This section covers Work to implement structural and non-structural Best Management Practices (BMP) to control soil erosion by wind or water and keep eroded sediments and other construction-generated pollutants from moving off project sites. Requirements described in this specification and shown on the Drawings are part of the Project Temporary Erosion and Sediment Control Plan (TESC Plan) and are the minimum for all project construction sites and conditions. This specification covers all project activities, including material sources, disposal sites, and offsite mitigation areas unless specific project activities are excluded elsewhere in this specification or in other Contract Documents controlling the Work.
- B. Other Regulations: The Florida Department of Environmental Protection (FDEP) must approve the Erosion and Sediment Control Plans. Adequate erosion and sediment control are essential for complying with the federal Endangered Species Act where construction runoff enters waters inhabited by protected species.

1.02 REFERENCES

- A. Activities shall conform to the State of Florida Department of Environmental Protection NPDES Generic Permit for Stormwater Discharge from Large and Small Construction Activities, and Contract Drawings. In the event of a conflict, the more stringent requirement shall apply.
- B. The following is a list of standards that may be referenced in this section:
 - 1. State of Florida Department of Environmental Protection NPDES Generic Permit for Stormwater Discharge from Large and Small Construction Activities. American Association of State Highway and Transportation Officials (AASHTO): M252, Standard Specification for Corrugated Polyethylene Drainage Pipe.
 - 2. ASTM International (ASTM):
 - a. D638, Standard Test Method for Tensile Properties of Plastics.
 - b. D2974, Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils.
 - c. D3776/D3776M, Standard Test Methods for Mass Per Unit Area (Weight) of Fabric.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- d. D4355, Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus.
 - e. D4397, Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications.
 - f. D4491, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
 - g. D4533, Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
 - h. D4632/D4632M, Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
 - i. D4751, Standard Test Method for Determining Apparent Opening Size of a Geotextile
 - j. D6241, Standard Test Method for Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe.
 - k. D6459, Standard Test Method for Determination of Rolled Erosion Control Product (RECP) Performance in Protecting Hillslopes from Rainfall-Induced Erosion.
 - l. D6460, Standard Test Method for Determination of Rolled Erosion Control Product (RECP) Performance in Protecting Earthen Channels from Stormwater-Induced Erosion.
 - m. D6475, Standard Test Method for Measuring Mass Per Unit Area of Erosion Control Blankets.
 - n. D7322, Standard Test Method for Determination of Rolled Erosion Control Product (RECP) Ability to Encourage Seed Germination and Plant Growth Under Bench-Scale Conditions.
 - o. D7367, Standard Test Method for Determining Water Holding Capacity of Fiber Mulches for Hydraulic Planting.
3. National Weather Service:
 - a. Precipitation-Frequency of the United States by State/Territory, 2012.
 - b. Precipitation Frequency Data Server, 2012.
 4. North American Weed Management Association (NAWMA).
 5. U.S. Department of Agriculture, Natural Resources Conservation Service: *Urban Hydrology for Small Watersheds*; 1986. Technical Release 55.
 6. U.S. Environmental Protection Agency:
 - a. Developing Your Stormwater Pollution Prevention Plan: A Guide for Construction Sites, 2007. EPA-833-R-06-004.
 - b. National Menu of BMPs, 2012.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

1.03 SYSTEM DESCRIPTION

- A. Erosion and Sediment Control:
1. Provide, maintain, and operate temporary facilities to control erosion and sediment releases during construction period.
 2. Design erosion and sediment controls to handle peak runoff resulting from 25-year, 24-hour storm event based on National Weather Service: Precipitation Frequency Data Server.
 3. Size temporary stormwater conveyances based on procedures presented in U.S. Department of Agriculture, Natural Resources Conservation Service: Urban Hydrology for Small Watersheds, 1986. Technical Release 55.
- B. Preventing erosion, and controlling runoff, sedimentation, and non-stormwater pollution, requires Contractor to perform temporary Work items including, but not limited to:
1. Providing ditches, berms, culverts, and other measures to control surface water.
 2. Building dams, settling basins, energy dissipaters, and other measures, to control downstream flows.
 3. Controlling underground water found during construction.
 4. Covering or otherwise protecting slopes until permanent erosion control measures are working.
- C. To the degree possible, coordinate this temporary Work with permanent drainage and erosion control work the Contract requires.
- D. Construction Manager may require additional temporary control measures if it appears pollution or erosion may result from weather, nature of materials, or progress on the Work.
- E. When natural elements rut or erode the slope, restore and repair damage with eroded material where possible, and remove and dispose of any remaining material found in ditches and culverts. When Construction Manager orders replacement with additional or other materials, unit Contract prices will cover quantities needed.
- F. Install all sediment control devices including, but not limited to, sediment ponds, perimeter silt fencing, or other sediment trapping BMPs prior to any ground disturbing activity. Do not expose more erodible earth than necessary during clearing, grubbing, excavation, borrow, or fill activities without written approval by Construction Manager. Construction Manager may increase or decrease the limits based on project conditions. Erodible earth is defined as

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

any surface where soils, grindings, or other materials may be capable of being displaced and transported by rain, wind, or surface water runoff. Cover inactive areas of erodible earth, whether at final grade or not, within specified time period (see NPDES Erosion and Sediment Control Permit), using an approved soil covering practice. Phase clearing and grading to maximum extent practical to prevent exposed inactive areas from becoming a source of erosion.

G. Water Management:

1. Manage site water in accordance with the conditions of the waste discharge permit from a local permitting authority. If site water management is not subject to permit, manage as follows:
 - a. Groundwater:
 - 1) When groundwater is encountered in an excavation, treat and discharge as follows:
 - a) When groundwater conforms to DNREC Water Quality Standards, it may bypass detention and treatment facilities and be routed directly to its normal discharge point at a rate and method that will not cause erosion.
 - b) When turbidity of groundwater is similar to turbidity of site runoff, groundwater may be treated using same detention and treatment facilities being used to treat the site runoff and then discharged at a rate that will not cause erosion.
 - c) When groundwater turbidity is greater than turbidity of site runoff, treat ground water separately until turbidity is similar to or better than site runoff, and then it may be combined with site runoff and treated as described above.
 - 2) When groundwater is encountered in an excavation, treat and discharge as follows:
 - a) When groundwater conforms to DNREC Water Quality Standards, it may bypass detention and treatment facilities and be routed directly to its normal discharge point at a rate and method that will not cause erosion.
 - b) When turbidity of groundwater is similar to turbidity of site runoff, groundwater may be treated using same detention and treatment facilities being used to treat the site runoff and then discharged at a rate that will not cause erosion.
 - c) When groundwater turbidity is greater than turbidity of site runoff, treat ground water separately until turbidity is similar to or better than site runoff, and then it may be combined with site runoff and treated as described above.
 - b. Process Water:
 - 1) Do not discharge high pH process water or wastewater (non-stormwater) that is generated onsite, including water generated during concrete grinding, rubblizing, washout, and hydrodemolition activities, to waters of the State of Florida, including wetlands. Water may be infiltrated upon approval of Construction Manager. Offsite disposal of concrete process water is subject to approval of Construction Manager.
 - 2) Treat all water generated onsite from construction or washing activities that is more turbid than site runoff separately until turbidity is the same or less than site runoff, and then it may be combined with site runoff and treated as

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

described above. Water may be infiltrated upon approval of Construction Manager.

- c. Offsite Water: Prior to disruption of normal watercourse, intercept offsite stormwater and pipe it either through or around the Project Site. This water shall not be combined with onsite stormwater. Discharge offsite water at its preconstruction outfall point preventing an increase in erosion below the site. Submit proposed method for performing this Work for Construction Manager's approval.

H. Pollution Control:

1. Use BMPs to prevent or minimize stormwater exposure to pollutants from spills; vehicle and equipment fueling, maintenance, and storage; other cleaning and maintenance activities; and waste handling activities. These pollutants include fuel, hydraulic fluid, and other oils from vehicles and machinery, as well as debris, leftover paints, solvents, and glues from construction operations. Implement the following BMPs when applicable:
 - a. Written spill prevention and response procedures.
 - b. Employee training on spill prevention and proper disposal procedures.
 - c. Spill kits in all vehicles.
 - d. Regular maintenance schedule for vehicles and machinery.
 - e. Material delivery and storage controls.
 - f. Training and signage.
 - g. Covered storage areas for waste and supplies.
 - h. Proper storage, including secondary containment, for fuel and chemicals in accordance with federal, state, and local regulations.
 - i. If Construction Manager orders the Work suspended, continue to control erosion, pollution, and runoff during the shutdown.

- I. Nothing in this section shall relieve Contractor from complying with other Contract requirements.

PART 2 PRODUCTS

2.01 GEOTEXTILE

- A. Geotextiles shall consist only of long chain polymeric fibers or yarns formed into a stable network such that the fibers or yarns retain their position relative to each other during handling, placement, and design service life. At least 95 percent by weight of the material shall be polyolefins or polyesters. The material shall be free from defects or tears. Geotextile shall also be free of any

JACKSONVILLE PORT AUTHORITY
 BLOUNT ISLAND EQUIPMENT WASH FACILITY

treatment or coating which might adversely alter its hydraulic or physical properties after installation. Geotextile properties shall be as described in Table 1 and Table 2.

Table 1 Geotextile for Permanent Erosion Control							
Geotextile Property	ASTM Test Method	Geotextile Property Requirements					
		Permanent Erosion Control				Ditch Lining	
		Moderate Survivability		High Survivability			
		Woven	Nonwoven	Woven	Nonwoven	Woven	Nonwoven
AOS	D4751	See Table 2		See Table 2		U.S. No. 30 max.	
Water Permittivity	D4491	See Table 2		See Table 2		0.02 sec ⁻¹ min.	
Grab Tensile Strength, in machine and x-machine direction	D4632/ D4632M	250 lb min.	160 lb min.	315 lb min.	200 lb min.	250 lb min.	160 lb min.
Grab Failure Strain, in machine and x-machine direction	D4632/ D4632M	15% -50%	≥50%	15% -50%	≥50%	<50%	≥50%
Seam Breaking Strength	D4632/ D4632M	220 lb min.	140 lb min.	270 lb min.	180 lb min.	220 lb min.	140 lb min.
Puncture Resistance	D6241	495 lb min.	310 lb min.	620 lb min.	430 lb min.	495 lb min.	310 lb min.
Tear Strength, in machine and x-machine direction	D4533	80 lb min.	50 lb min.	112 lb min.	79 lb min.	80 lb min.	50 lb min.
Ultraviolet (UV) Radiation Stability	D4355	70% strength retained min., after 500 hours in xenon arc device					

Table 2 Filtration Properties for Geotextile for Permanent Erosion Control				
Geotextile Property	ASTM Test Method	Geotextile Property Requirements		
		Class A	Class B	Class C
AOS	D4751	U.S. No. 40 max.	U.S. No. 60 max.	U.S. No. 70 max.
Water Permittivity	D4491	0.7 sec-1 min.	0.4 sec-1 min.	0.2 sec-1 min.

2.02 HIGH VISIBILITY FENCING

- A. High Visibility Fence: UV stabilized, orange, high-density polyethylene or polypropylene mesh.
- B. Height: 4 feet minimum.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- C. Support Posts: Wood or steel with sufficient strength and durability to support the fence through the life of the Project.

2.03 INLET PROTECTION

- A. As specified in Table 2.

2.04 SEDIMENT CONTROL BARRIERS

- A. Specified by Contractor with approval of Construction Manager. May include Erosion Eel.

2.05 STREET CLEANING

- A. Use self-propelled pickup street sweeper(s). Mechanical broom sweepers are not allowed where environmental concerns exist about storm water pollution or air quality.

2.06 TIRE WHEEL WASH FACILITY

- A. Specified by Contractor with approval of Construction Manager. Wheel wash facilities should have a nonerosive base, and a small grade change, 6 inches to 12 inches for a 10-foot-wide pond, to allow sediment to flow to low side of pond to help prevent re-suspension of sediment. A drainpipe with a 2-foot to 3-foot riser should be installed at low side of pond to allow for cleaning and refilling. Pond should be deep enough to hold 14 inches of water after displacement. Alternatively, pressure washing combined with an adequately sized and adequately surfaced pad with direct drainage to a 10-foot by 10-foot sump can be very effective.

PART 3 EXECUTION

3.01 PREPARATION

- A. Include proposed stockpile areas and installation of temporary erosion control devices, ditches, or other facilities in Work phasing plans.
- B. Areas designated for Contractor's use during Project may be temporarily developed as specified to provide working, staging, and administrative areas. Control of sediment from these areas is required within the Contract.
- C. Inlet Protection: Install inlet protection below or above, or as a prefabricated cover at each inlet grate, as shown on the Drawings. Install inlet protection devices prior to beginning clearing, grubbing or earthwork activities. Geotextile fabric used in prefabricated inlet protection devices must meet or

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

exceed the requirements for Moderate Survivability and minimum filtration properties. When depth of accumulated sediment and debris reaches approximately one-half the height of an internal device or one-third the height of external device (or less when so specified by the manufacturers) or as designated by Construction Manager, remove deposits and stabilize onsite.

1. Below Inlet Gate:
 - a. Prefabricated units specifically designed for inlet protection.
 - b. Must remain securely attached to drainage structure when fully loaded with sediment and debris or at the maximum level of sediment and debris specified by manufacturer.
 2. Above Inlet Gate:
 - a. Devices may be silt fence, sandbags, or prefabricated units specifically designed for inlet protection.
 - b. Must remain securely in place around drainage structure under all conditions.
 3. Inlet Grate Cover:
 - a. Prefabricated units specifically designed for inlet protection and:
 - 1) Be a sewn geotextile fabric unit fitted to individual grate and completely enclosing grate.
 - 2) Have built-in lifting devices to allow manual access of stormwater system.
 - 3) Use an orange monofilament geotextile fabric.
 - b. Check dams or functionally equivalent devices may be used as inlet protection devices with approval of Construction Manager.
- D. Street Cleaning: Use self-propelled pickup street sweepers whenever required by Construction Manager to prevent transport of sediment and other debris off Project Site. Provide street sweepers designed and operated to meet air quality standards. Street washing with water will require approval by Construction Manager. Intentional washing of sediment into storm sewers or drainage ways must not occur. Vacuuming or dry sweeping and material pickup must be used to cleanup released sediments.
- E. Tire Wheel Wash Facility: When the Contract requires a tire wash (in conjunction with a stabilized entrance), include details for tire wash and method for containing and treating sediment-laden runoff as part of the TESC Plan. All vehicles leaving the Site shall stop and wash sediment from their tires. Keep the water level 12 inches to 14 inches deep. Change wash water a minimum of once per day. Polymers may be used to promote coagulation and flocculation in a closed-loop system. Polyacrylamide (PAM) added to the wheel wash water at a rate of 0.25 pound to 0.5 pound per 1,000 gallons of water increases effectiveness and reduces cleanup time.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3.02 MAINTENANCE

- A. The ESCP measures described in this specification are minimum requirements for anticipated Site conditions. During the construction period, upgrade these measures as needed to comply with all applicable local, state, and federal erosion and sediment control regulations.
- B. Maintain erosion and sediment control BMPs so they properly perform their function until Construction Manager determines they are no longer needed.
- C. Construction activities must avoid or minimize excavation and creation of bare ground during wet weather.
- D. The intentional washing of sediment into storm sewers or drainage ways must not occur. Vacuuming or dry sweeping and material pickup must be used to cleanup released sediments.
- E. Inspect BMPs in accordance with the schedule in the Construction Stormwater Discharge Permit(s) or as directed by Construction Manager.
- F. Complete an inspection report within 24 hours of an inspection. Each inspection report shall be signed and identify corrective actions. Document that corrective actions are performed within 7 days of identification. Keep a copy of all inspection reports at the Site or at an easily accessible location.
- G. Unless otherwise specified, remove deposits before the depth of accumulated sediment and debris reaches approximately height of BMP. Dispose of debris or contaminated sediment at approved locations. Clean sediments may be stabilized onsite using BMPs as approved by Construction Manager.
- H. Catch Basins: Clean before retention capacity has been reduced by 50 percent.
- I. Initiate repair or replacement of damaged erosion and sediment control BMPs immediately, and work completed by end of next workday. Significant replacement or repair must be completed within 7 days, unless infeasible.
- J. Within 24 hours, remediate any significant sediment that has left construction site. Investigate cause of the sediment release and implement steps to prevent a recurrence of discharge within same 24 hours. Perform in-stream cleanup of sediment according to applicable regulations.
- K. At end of each workday, stabilize or cover soil stockpiles or implement other BMPs to prevent discharges to surface waters or conveyance systems leading to surface waters.

JACKSONVILLE PORT AUTHORITY
 BLOUNT ISLAND EQUIPMENT WASH FACILITY

- L. Temporarily stabilize soils at end of shift before holidays and weekends, if needed. Ensure soils are stable during rain events at all times of year.
- M. Initiate stabilization by no later than end of next workday after construction work in an area has stopped permanently or temporarily.
- N. Within 14 days of initiating stabilization or as specified in permit, apply nonvegetative measures and cover all areas of exposed soil. Seed dry areas as soon as Site conditions allow. Ensure that vegetation covers at least 70 percent of stabilized area. Nonvegetative measures may include blown straw and a tackifier, loose straw, or an adequate covering of compost mulch. Complete initial stabilization within 7 days if storm water discharges to surface waters impaired for sediment or nutrients, or high-quality waters.
- O. Provide permanent erosion control measures on all exposed areas. Do not remove temporary sediment control practices until permanent vegetation or other cover of exposed areas is established. However, do remove all temporary erosion control measures as exposed areas become stabilized, unless doing so conflicts with local requirements. Properly dispose of construction materials and waste, including sediment retained by temporary BMPs.

3.03 EMERGENCY MATERIALS

- A. Provide, stockpile, and protect the following emergency erosion and sediment control materials on the Project Site for unknown weather or erosion conditions. Emergency materials are in addition to other erosion control materials required to implement and maintain the TESC Plan. Replenish emergency materials as they are used. Remove all unused emergency materials from the Project Site at completion of the Project.

Item	Quantity
Plastic sheeting	500 sq ft
Rope	1,000 ft
Sand bags (empty, to be filled as needed)	50
Straw bales	10
Biofilter bags (with stakes)	10
Water pump and hose	Two of each

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3.04 REMOVAL

- A. When Construction Manager determines that an erosion control BMP is no longer required, remove BMP and all associated hardware from the Project limits. When materials are biodegradable, Construction Manager may approve leaving temporary BMP in place.
- B. Permanently stabilize all bare and disturbed soil after removal of erosion and sediment control BMPs. Dress sediment deposits remaining after BMPs have been removed to conform to existing grade. Prepare and seed graded area. If installation and use of erosion control BMPs have compacted or otherwise rendered soil inhospitable to plant growth, such as construction entrances, take measures to rehabilitate soil to facilitate plant growth. This may include, but is not limited to, ripping the soil, incorporating soil amendments, or seeding with specified seed.
- C. Stabilization: Stabilize disturbed areas not to receive building or pavement with grass when final grade is established per other sections.

END OF SECTION

SECTION 01 61 00
COMMON PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 DEFINITIONS

A. Products:

1. New items for incorporation in the Work, whether purchased by Contractor or Owner for the Project, or taken from previously purchased stock, and may also include existing materials or components required for reuse.
2. Includes the terms material, equipment, machinery, components, subsystem, system, hardware, software, and terms of similar intent and is not intended to change meaning of such other terms used in Contract Documents, as those terms are self-explanatory and have well recognized meanings in construction industry.
3. Items identified by manufacturer's product name, including make or model designation, indicated in manufacturer's published product literature, that is current as of the date of the Contract Documents.

1.02 DESIGN REQUIREMENTS

- A. Refer to relevant specification section.

1.03 ENVIRONMENTAL REQUIREMENTS

- A. Altitude: Provide materials and equipment suitable for installation and operation under rated conditions at 0 feet to 25 feet above sea level.
- B. Provide equipment and devices installed outdoors or in unheated enclosures capable of continuous operation within an ambient temperature range of minus 23 degrees F to 130 degrees F.

1.04 PREPARATION FOR SHIPMENT

- A. When practical, factory assemble products. Mark or tag separate parts and assemblies to facilitate field assembly. Cover machined and unpainted parts that may be damaged by the elements with strippable protective coating.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- B. Package products to facilitate handling and protect from damage during shipping, handling, and storage. Mark or tag outside of each package or crate to indicate its purchase order number, bill of lading number, contents by name, name of Project and Contractor, equipment number, and approximate weight. Include complete packing list and bill of materials with each shipment.
- C. Extra Materials, Special Tools, Test Equipment, and Expendables:
 - 1. Furnish as required by individual Specifications.
 - 2. Schedule:
 - a. Ensure that shipment and delivery occurs concurrent with shipment of associated equipment.
 - b. Transfer to Owner shall occur immediately subsequent to Contractor's acceptance of equipment from Supplier.
 - 3. Packaging and Shipment:
 - a. Package and ship extra materials and special tools to avoid damage during long term storage in original cartons insofar as possible, or in appropriately sized, hinged-cover, wood, plastic, or metal box.
 - b. Prominently displayed on each package, the following:
 - 1) Manufacturer's part nomenclature and number, consistent with Operation and Maintenance Manual identification system.
 - 2) Applicable equipment description.
 - 3) Quantity of parts in package.
 - 4) Equipment manufacturer.
 - 4. Deliver materials to Site.
 - 5. Notify Construction Manager upon arrival for transfer of materials.
 - 6. Replace extra materials and special tools found to be damaged or otherwise inoperable at time of transfer to Owner.
- D. Request a minimum 7-day advance notice of shipment from manufacturer. Upon receipt of manufacturer's advance notice of shipment, promptly notify Construction Manager of anticipated date and place of equipment arrival.
- E. Factory Test Results: Reviewed and accepted by Construction Manager before product shipment as required in individual specification sections.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

1.05 DELIVERY AND INSPECTION

- A. Deliver products in accordance with accepted current Progress Schedule and coordinate to avoid conflict with the Work and conditions at Site. Deliver anchor bolts and templates sufficiently early to permit setting prior to placement of structural concrete.
- B. Deliver products in undamaged condition, in manufacturer's original container or packaging, with identifying labels intact and legible. Include on label, date of manufacture and shelf life, where applicable.
- C. Unload products in accordance with manufacturer's instructions for unloading or as specified. Record receipt of products at Site. Promptly inspect for completeness and evidence of damage during shipment.
- D. Remove damaged products from Site and expedite delivery of identical new undamaged products, and remedy incomplete or lost products to provide that specified, so as not to delay progress of the Work.

1.06 HANDLING, STORAGE, AND PROTECTION

- A. Handle and store products in accordance with manufacturer's written instructions and in a manner to prevent damage. Store in approved storage yards or sheds provided in accordance with Section 01 50 00, Temporary Facilities and Controls. Provide manufacturer's recommended maintenance during storage, installation, and until products are accepted for use by Owner.
- B. Manufacturer's instructions for material requiring special handling, storage, or protection shall be provided prior to delivery of material.
- C. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to ensure that products are maintained under specified conditions, and free from damage or deterioration. Keep running account of products in storage to facilitate inspection and to estimate progress payments for products delivered, but not installed in the Work.
- D. Store electrical, instrumentation, and control products, and equipment with bearings in weather-tight structures maintained above 60 degrees F. Protect electrical, instrumentation, and control products, and insulate against moisture, water, and dust damage. Connect and operate continuously space heaters furnished in electrical equipment.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- E. Store fabricated products above ground on blocking or skids, and prevent soiling or staining. Store loose granular materials in well-drained area on solid surface to prevent mixing with foreign matter. Cover products that are subject to deterioration with impervious sheet coverings; provide adequate ventilation to avoid condensation.
- F. Store finished products that are ready for installation in dry and well-ventilated areas. Do not subject to extreme changes in temperature or humidity.
- G. After installation, provide coverings to protect products from damage due to traffic and construction operations. Remove coverings when no longer needed.
- H. Hazardous Materials: Prevent contamination of personnel, storage area, and Site. Meet requirements of product specification, codes, and manufacturer's instructions.

PART 2 PRODUCTS

2.01 GENERAL

- A. Provide manufacturer's standard materials suitable for service conditions, unless otherwise specified in the individual specification sections.
- B. Where product specifications include a named manufacturer, with or without model number, and also include performance requirements, named manufacturer's products must meet the performance specifications.
- C. Like items of products furnished and installed in the Work shall be end products of one manufacturer and of the same series or family of models to achieve standardization for appearance, operation and maintenance, spare parts and replacement, manufacturer's services, and implement same or similar process instrumentation and control functions in same or similar manner.
- D. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.
- E. Provide interchangeable components of the same manufacturer, for similar components, unless otherwise specified.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- F. Equipment, Components, Systems, and Subsystems: Design and manufacture with due regard for health and safety of operation, maintenance, and accessibility, durability of parts, and shall comply with applicable OSHA, state, and local health and safety regulations.
- G. Regulatory Requirement: Coating materials shall meet federal, state, and local requirements limiting the emission of volatile organic compounds and for worker exposure.
- H. Safety Guards: Provide for all belt or chain drives, fan blades, couplings, or other moving or rotary parts. Cover rotating part on all sides. Design for easy installation and removal. Use 16-gauge or heavier; galvanized steel, aluminum coated steel, or galvanized or aluminum coated 1/2-inch mesh expanded steel. Provide galvanized steel accessories and supports, including bolts. For outdoors application, prevent entrance of rain and dripping water.
- I. Authority Having Jurisdiction (AHJ):
 - 1. Provide the Work in accordance with NFPA 70, National Electrical Code (NEC). Where required by the AHJ, material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ in order to provide a basis for approval under NEC.
 - 2. Materials and equipment manufactured within the scope of standards published by UL shall conform to those standards and shall have an applied UL listing mark.
- J. Equipment Finish:
 - 1. Provide manufacturer's standard finish and color, except where specific color is indicated.
 - 2. If manufacturer has no standard color, provide equipment with finish as approved by Construction Manager.
- K. Special Tools and Accessories: Furnish to Owner, upon acceptance of equipment, all accessories required to place each item of equipment in full operation. These accessory items include, but are not limited to, adequate oil and grease (as required for first lubrication of equipment after field testing), light bulbs, fuses, hydrant wrenches, valve keys, handwheels, chain operators, special tools, and other spare parts as required for maintenance.
- L. Lubricant: Provide initial lubricant recommended by equipment manufacturer in sufficient quantity to fill lubricant reservoirs and to replace consumption during testing, startup, and operation until final acceptance by Construction Manager.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- M. Components and Materials in Contact with Water for Human Consumption: Comply with the requirements of the Safe Drinking Water Act and other applicable federal, state, and local requirements. Provide certification by manufacturer or an accredited certification organization recognized by the Authority Having Jurisdiction that components and materials comply with the maximum lead content standard in accordance with NSF/ANSI 61 and NSF/ANSI 372.
1. Use or reuse of components and materials without a traceable certification is prohibited.

2.02 FABRICATION AND MANUFACTURE

A. General:

1. Manufacture parts to U.S.A. standard sizes and gauges.
2. Two or more items of the same type shall be identical, by the same manufacturer, and interchangeable.
3. Design structural members for anticipated shock and vibratory loads.
4. Use 1/4-inch minimum thickness for steel that will be submerged, wholly or partially, during normal operation.
5. Modify standard products as necessary to meet performance Specifications.

B. Lubrication System:

1. Require no more than weekly attention during continuous operation.
2. Convenient and accessible; oil drains with bronze or stainless steel valves and fill-plugs easily accessible from the normal operating area or platform. Locate drains to allow convenient collection of oil during oil changes without removing equipment from its installed position.
3. Provide constant-level oilers or oil level indicators for oil lubrication systems.
4. For grease type bearings, which are not easily accessible, provide and install stainless steel tubing; protect and extend tubing to convenient location with suitable grease fitting.

2.03 SOURCE QUALITY CONTROL

- A. Where Specifications call for factory testing to be witnessed by Construction Manager, notify Construction Manager not less than 14 days prior to scheduled test date, unless otherwise specified.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- B. Calibration Instruments: Bear the seal of a reputable laboratory certifying instrument has been calibrated within the previous 12 months to a standard endorsed by the National Institute of Standards and Technology (NIST).
- C. Factory Tests: Perform in accordance with accepted test procedures and document successful completion.

PART 3 EXECUTION

3.01 INSPECTION

- A. Inspect materials and equipment for signs of pitting, rust decay, or other deleterious effects of storage. Do not install material or equipment showing such effects. Remove damaged material or equipment from the Site and expedite delivery of identical new material or equipment. Delays to the Work resulting from material or equipment damage that necessitates procurement of new products will be considered delays within Contractor's control.

3.02 MANUFACTURER'S CERTIFICATE OF COMPLIANCE

- A. When so specified, a Manufacturer's Certificate of Compliance, a copy of which is attached to this section, shall be completed in full, signed by entity supplying the product, material, or service, and submitted prior to shipment of product or material or execution of the services.
- B. Construction Manager may permit use of certain materials or assemblies prior to sampling and testing if accompanied by accepted certification of compliance.
- C. Such form shall certify proposed product, material, or service complies with that specified. Attach supporting reference data, affidavits, and certifications as appropriate.
- D. May reflect recent or previous test results on material or product, if acceptable to Construction Manager.

3.03 INSTALLATION

- A. Equipment Drawings show general locations of equipment, devices, and raceway, unless specifically dimensioned.
- B. No shimming between machined surfaces is allowed.
- C. Install the Work in accordance with NECA Standard of Installation, unless otherwise specified.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- D. Repaint painted surfaces that are damaged prior to equipment acceptance.
- E. Do not cut or notch any structural member or building surface without specific approval of Construction Manager.
- F. Handle, install, connect, clean, condition, and adjust products in accordance with manufacturer's instructions, and as may be specified. Retain a copy of manufacturers' instruction at Site, available for review at all times.
- G. For material and equipment specifically indicated or specified to be reused in the Work:
 - 1. Use special care in removal, handling, storage, and reinstallation to assure proper function in the completed Work.
 - 2. Arrange for transportation, storage, and handling of products that require offsite storage, restoration, or renovation. Include costs for such Work in the Contract Price.

3.04 ADJUSTMENT AND CLEANING

- A. Perform required adjustments, tests, operation checks, and other startup activities.

3.05 LUBRICANTS

- A. Fill lubricant reservoirs and replace consumption during testing, startup, and operation prior to acceptance of equipment by Owner.

3.06 SUPPLEMENT

- A. The supplement listed below, following "End of Section," is a part of this specification:
 - 1. Manufacturer's Certificate of Compliance.

END OF SECTION

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

MANUFACTURER'S CERTIFICATE OF COMPLIANCE

OWNER: _____ PRODUCT, MATERIAL, OR SERVICE
PROJECT NAME: _____ SUBMITTED: _____
PROJECT NO: _____

Comments: _____

I hereby certify that the above-referenced product, material, or service called for by the Contract for the named Project will be furnished in accordance with all applicable requirements. I further certify that the product, material, or service are of the quality specified and conform in all respects with the Contract requirements, and are in the quantity shown.

Date of Execution: _____, 20__

Manufacturer: _____

Manufacturer's Authorized Representative (*print*): _____

(Authorized Signature)

SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 SUBMITTALS

A. Informational Submittals:

1. Submit prior to application for final payment.
 - a. Record Documents: As required in General Conditions.
 - b. Approved Shop Drawings and Samples: As required in the General Conditions.
 - c. Special bonds, Special Guarantees, and Service Agreements.
 - d. Consent of Surety to Final Payment: As required in General Conditions.
 - e. Releases or Waivers of Liens and Claims: As required in General Conditions.
 - f. Releases from Agreements.
 - g. Final Application for Payment: Submit in accordance with procedures and requirements stated in General Conditions.
 - h. Extra Materials: As required by individual Specification sections.

1.02 RECORD DOCUMENTS

A. Quality Assurance:

1. Furnish qualified and experienced person, whose duty and responsibility shall be to maintain record documents.
2. Accuracy of Records:
 - a. Coordinate changes within record documents, making legible and accurate entries on each sheet of Drawings and other documents where such entry is required to show change.
 - b. Purpose of Project record documents is to document factual information regarding aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive Site measurement, investigation, and examination.
3. Make entries within 24 hours after receipt of information that a change in the Work has occurred. Summarize as-built changed documented during Progress Meetings and provide documentation to Construction Manager upon receipt.
4. Prior to submitting each request for progress payment, request Construction Manager's review and approval of current status of record

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

documents. Failure to properly maintain, update, and submit record documents may result in a deferral by Construction Manager to recommend whole or any part of Contractor's Application for Payment, either partial or final.

1.03 RELEASES FROM AGREEMENTS

- A. Furnish Owner written releases from property owners or public agencies where side agreements or special easements have been made, or where Contractor's operations have not been kept within the Owner's construction right-of-way.
- B. In the event Contractor is unable to secure written releases:
 - 1. Inform Owner of the reasons.
 - 2. Construction Manager will examine the Site, and will direct Contractor to complete the Work that may be necessary to satisfy terms of the side agreement or special easement.
 - 3. Should Contractor refuse to perform this Work, Owner reserves right to have it done by separate contract and deduct cost of same from Contract Price, or require Contractor to furnish a satisfactory bond in a sum to cover legal Claims for damages.
 - 4. When Construction Manager is satisfied that the Work has been completed in agreement with Contract Documents and terms of side agreement or special easement, right is reserved to waive requirement for written release if: (i) Contractor's failure to obtain such statement is due to grantor's refusal to sign, and this refusal is not based upon any legitimate Claims that Contractor has failed to fulfill terms of side agreement or special easement, or (ii) Contractor is unable to contact or has had undue hardship in contacting grantor.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 MAINTENANCE OF RECORD DOCUMENTS

- A. General:
 - 1. Promptly following commencement of Contract Period, secure from Construction Manager at no cost to Contractor, one complete set of Contract Documents. Drawings will be full size PDFs.
 - 2. Label or stamp each record document with title, "RECORD DOCUMENTS," in neat large printed letters.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3. Record information concurrently with construction progress and within 24 hours after receipt of information that change has occurred. Do not cover or conceal Work until required information is recorded.
 4. Electronic PDF record drawings accurately annotated are acceptable.
- B. Preservation:
1. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
 2. Make documents and Samples available at all times for observation by Construction Manager.
- C. Making Entries on the Drawings:
1. Using an erasable colored pencil (not ink or indelible pencil) or using Adobe software clearly describe change by graphic line and note as required.
 - a. Color Coding:
 - 1) Green when showing information deleted from Drawings.
 - 2) Red when showing information added to Drawings.
 - 3) Blue and circled in blue to show notes.
 2. Date entries.
 3. Call attention to entry by “cloud” drawn around area or areas affected.
 4. Legibly mark to record actual changes made during construction, including, but not limited to:
 - a. Depths of various elements of foundation in relation to finished first floor data if not shown or where depth differs from that shown.
 - b. Horizontal and vertical locations of existing and new Underground Facilities and appurtenances, and other underground structures, equipment, or Work. Reference to at least two measurements to permanent surface improvements.
 - c. Location of internal utilities and appurtenances concealed in the construction referenced to visible and accessible features of the structure.
 - d. Locate existing facilities, piping, equipment, and items critical to the interface between existing physical conditions or construction and new construction.
 - e. Changes made by Addenda and Field Orders, Work Change Directive, Change Order, and Construction Manager’s written interpretation and clarification using consistent symbols for each and showing appropriate document tracking number.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

5. Dimensions on Schematic Layouts: Show on record drawings, by dimension, the centerline of each run of items such as are described in previous subparagraph above.
 - a. Clearly identify the item by accurate note such as “cast-iron drain,” “galv. water,” and the like.
 - b. Show, by symbol or note, vertical location of item (“under slab,” “in ceiling plenum,” “exposed,” and the like).
 - c. Make identification so descriptive that it may be related reliably to Specifications.

D. As-Built Drawings:

1. Contractor shall perform an as-built survey using a Licensed Surveyor registered in the State of Florida including topography, locations of structures and the like.
2. Contractor shall prepare as-built drawings including all revisions from the Contract Drawings and submit to the Construction Manager for review and acceptance.

3.02 FINAL CLEANING

- A. At completion of the Work or phase and immediately prior to Contractor’s request for certificate of Substantial Completion; or if no certificate is issued, immediately prior to Contractor’s notice of completion, clean entire Site or parts thereof, as applicable.
 1. Leave the Work and adjacent areas affected in a cleaned condition satisfactory to Owner.
 2. Remove grease, dirt, dust, paint or plaster splatter, stains, labels, fingerprints, and other foreign materials from exposed surfaces.
 3. Repair, patch, and touch up marred surfaces to specified finish and match adjacent surfaces.
 4. Broom clean exterior paved driveways and parking areas.
 5. Hose clean sidewalks, loading areas, and others contiguous with principal structures.
 6. Rake clean all other surfaces.
 7. Replace air-handling filters and clean ducts, blowers, and coils of ventilation units operated during construction.
 8. Leave water courses, gutters, and ditches open and clean.
- B. Use only cleaning materials recommended by manufacturer of surfaces to be cleaned.

END OF SECTION

**SECTION 02 41 00
DEMOLITION**

PART 1 GENERAL

1.01 GENERAL

- A. Perform all Work in accordance with Contract Documents, and applicable codes, standards and specifications of governing authorities having jurisdiction over the Work.

1.02 VERIFYING EXISTING CONDITIONS

- A. Contractor shall verify existing conditions at the Site, and examine adjoining work which in any way will affect the completion of this Work. Contractor shall walk entire Site prior to preparing Contractor's bid and shall include in Contractor's bid the cost to demolish and dispose offsite all material which will impact Contractor's construction. All fees required for disposal of debris of whatever nature encountered shall be included in Contractor's base price. Disposal shall be in accordance with all federal, state, and local regulations.
- B. Contractor shall report to the Construction Manager in writing, any condition that will prevent the proper performance of the Work.
- C. No waiver of responsibility for defective adjoining work will be considered unless notice has been filed by the Contractor and agreed to in writing by the Construction Manager before Contractor begins any part of this Work.

1.03 LIAISON PERSONNEL

- A. The Owner will assign personnel to act as liaison with the Contractor in order that the Work is properly coordinated with the Owner's necessary functions and operations.
- B. Liaison personnel will advise the Contractor of utility services and facilities which must be maintained.
- C. When requested by the Owner, the Contractor shall delay specific construction operations that result in inconveniences to the Tenant's operations.
- D. Liaison personnel shall work with the Contractor to establish a schedule of hours in which construction operations may be carried on with minimum inconveniences to the Owner's operations.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

1.04 MAINTENANCE OF SERVICES

- A. Make temporary shut downs of any utility service or facility only at such times as agreed upon and with prior knowledge and consent of the Construction Manager and Owner.
- B. In case of accidental interruption of any utility service or facility during the course of the Work, the Contractor shall immediately place an adequate force at the source of such interruption to place same back in service with the least possible delay.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 DEBRIS

- A. Do not permit debris or unsalvageable material resulting from removal operations to accumulate on the Site.
- B. Remove debris as rapidly as it accumulates.
 - 1. Do not dispose of debris in waterways.
 - 2. Keep debris damp enough to minimize dust.
 - 3. Provide for offsite disposal areas.

3.02 MAINTENANCE TRAFFIC

- A. Accomplish Work with minimum interference to pedestrian and vehicular traffic on Site, within the marine terminal and on adjacent streets and highways.

3.03 PROTECTION OF STRUCTURES AND PROPERTY

- A. Work to protect existing structures and adjacent property against damages from any cause.
- B. Take precautions to guard against movement or settlement of existing structures.
- C. Furnish and install bracing or shoring as necessary and ensure proper connections therewith.
- D. Be responsible for safety and support of existing structures; be liable for any movement or settlement.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- E. If, at any time, safety of existing structure appears endangered, cease operations and notify the Construction Manager.
- F. Take precautions to support structures and do not resume operations until the Construction Manager has granted permission.
- G. Repair any damage done to the structures and property by reason of required safety measures.
- H. The Owner's liaison personnel will advise Contractor of any material that shall remain the property of the Owner. Contractor is to make all effort not to damage these items.

3.04 THE WORK

- A. Demolition includes removal of existing pavements and other features as shown on the Drawings. Limerock shall be stockpiled for improvement of subgrades if necessary. The work includes disposal offsite of materials marked on the construction plan as demolition.
- B. Concealed lines for such utilities as water, power, lighting, steam, air, sanitary waste, gas, etc., which may be uncovered during progress of the Work and which are essential for Owner's services and functions shall be adequately protected until such utility line or lines are temporarily or permanently rerouted as directed by the Construction Manager in order to prevent any interruption of required services.
- C. Contractor shall inform the Construction Manager immediately when such situations occur.
- D. Where alterations occur, or new or old work join, cut, remove, patch, repair and finish the immediate adjacent surfaces or so much thereof as required to match existing adjacent surfaces.
- E. Materials and workmanship employed in the Work involving new construction shall conform to the Contract Documents.
- F. Provide necessary temporary protection of those portions of the existing structures where existing work is demolished or removed and where new Work is scheduled and connections made.
- G. Install adequate guards, barricades or other temporary protective methods as required by safety codes to prevent injury to persons or damage to property. Barricades shall remain in place until concrete has reached its design strength and for a minimum of 14 days after pouring.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- H. When the need for temporary protection no longer exists, and Construction Manager and the Owner approve, Contractor shall remove all protective devices from the Project Site.
- I. Only mechanics skilled in the trade involved are allowed to disconnect, cap, seal, relocate or reconnect service or utility which is required under the Work.
- J. Where existing asphalt concrete pavement is to be demolished it shall be saw cut to a neat edge.

END OF SECTION

SECTION 03 10 00
CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Concrete Institute (ACI):
 - a. 117, Specification for Tolerances for Concrete Construction and Materials.
 - b. 301, Specifications for Structural Concrete.
 - c. 318, Building Code Requirements for Structural Concrete.
 - d. 347, Guide to Formwork for Concrete.

1.02 DEFINITIONS

- A. Defective Areas: See definition in Section 03 30 00, Cast-in-Place Concrete.
- B. Exposed Concrete: See definition in Section 03 30 00, Cast-in-Place Concrete.

1.03 DESIGN REQUIREMENTS

- A. Design formwork in accordance with ACI 301 and ACI 318 and ACI 347, to provide concrete finishes specified in Section 03 30 00, Cast-in-Place Concrete.
- B. When high-range water reducer (superplasticizer) is used in concrete mix, form design shall account for increased hydrostatic pressures.
- C. Joints in forms shall be watertight.
- D. Limit panel deflection to 1/360th of each component span to achieve tolerance specified.

1.04 SUBMITTALS

- A. Action Submittals:
 1. Shop Drawings: Layout of panel joints and tie hole pattern.
 2. Product Data:
 - a. Form release agent.
 - b. Form ties.
 - c. Products to be used for sealing tie holes.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

B. Informational Submittals:

1. Statement of qualifications for formwork designer.
2. Include formwork design calculations for review.

1.05 QUALITY ASSURANCE

A. Qualifications:

1. Formwork Designer: Formwork, falsework, and shoring design shall be designed by an engineer licensed in the State of Florida.

PART 2 PRODUCTS

2.01 FORM MATERIALS

A. Wall Forms and Underside of Slabs and Beams:

1. Materials: Plywood, hard plastic finished plywood, overlaid waterproof particle board, or steel in “new and undamaged” condition, of sufficient strength and surface smoothness to produce specified finish.
2. Where steel forms are used, treat steel surfaces to prevent rusting using products approved for use on steel forms.

B. All Other Forms: Materials as specified for wall forms.

2.02 ACCESSORIES

A. Form Release Agent:

1. Material:
 - a. Shall not bond with, stain, or adversely affect concrete surfaces.
 - b. Shall not impair subsequent treatments of concrete surfaces when applied to forms.
 - c. Ready-to-use water based material formulated to reduce or eliminate surface imperfections.
 - d. Contain no mineral oil or organic solvents.
2. Manufacturers and Products: Not for surfaces exposed to potable water.
 - a. BASF, Shakopee, MN; MBT MasterFinish RL 211.
 - b. Cresset Chemical Company; Crete-Lease 20-VOC-Xtra.

B. Beveled Edge Corner Strips: Nonabsorbent material, compatible with form surface, fully sealed on all sides prohibiting loss of paste or water between the two surfaces.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- C. Form Snap-Ties:
1. Material: Steel.
 2. Spreader Inserts:
 - a. Conical or spherical type.
 - b. Design to maintain positive contact with forming material.
 - c. Furnish units that will leave no metal closer than 1.5 inches to concrete surface when forms, inserts, and tie ends are removed.
 3. Wire ties not permitted.
 4. Flat bar ties for panel forms; furnish plastic or rubber inserts with minimum 1.5-inch depth and sufficient dimensions to permit patching of tie hole.
- D. Form Snap-Ties with Water Stop:
1. For water-holding structures, basements, pipe galleries, and accessible spaces below finish grade, furnish one of the following:
 - a. Integral steel water stop 0.103-inch thick and 0.625-inch diameter tightly and continuously welded to tie.
 - b. Neoprene water stop 3/16-inch thick and 15/16-inch diameter whose center hole is one-half diameter of tie, or molded plastic water stop of comparable size.
 - c. Orient water stop perpendicular to tie and symmetrical about center of tie.
 - d. Design ties to prevent rotation or disturbance of center portion of tie during removal of ends and to prevent water leaking along tie.
- E. Through-Bolts:
1. At Contractor's option, may be used as alternate to form snap-tie or form snap-tie with water stop.
 2. Tapered minimum 1-inch diameter at smallest end.

PART 3 EXECUTION

3.01 FORM SURFACE PREPARATION

- A. Prior to coating surface, thoroughly clean form surfaces that will be in contact with concrete or that have been in contact with previously cast concrete, dirt, and other surface contaminants.
- B. Exposed Wood Forms in Contact with Concrete: Apply form release agent as recommended by manufacturer.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- C. Steel Forms: Apply form release agent as soon as they are cleaned to prevent discoloration of concrete from rust.

3.02 ERECTION

- A. General: In accordance with ACI 301 and ACI 347, unless otherwise specified.
- B. Beveled Edges (Chamfer):
 - 1. Form 3/4-inch bevels at concrete edges, unless otherwise shown.
 - 2. Where beveled edges on existing adjacent structures are other than 3/4 inch, obtain Construction Manager's approval of size prior to placement of beveled edge.
- C. Wall Forms:
 - 1. Do not reuse forms with damaged surfaces.
 - 2. Locate form ties and joints in uninterrupted uniform pattern.
 - 3. Inspect form surfaces prior to installation to ensure conformance with specified tolerances.
- D. Form Tolerances:
 - 1. Provide forms in accordance with ACI 117, ACI 347 and ACI 318, and the following tolerances for finishes specified in Section 03 30 00, Cast-in-Place Concrete.
 - a. Wall Tolerances:
 - 1) Straight Vertical or Horizontal Wall Surface: Flat planes within tolerance specified.
 - 2) Wall Type W-A:
 - a) Plumb within 1/4 inch in 10 feet or within 1 inch from top to bottom for walls over 40 feet high.
 - b) Depressions in Wall Surface: Maximum 5/16 inch when 10-foot straightedge is placed on high points in all directions.
 - 3) Thickness: Maximum 1/4-inch minus or 1/2-inch plus from dimension shown.
 - 4) Form Offset: Between adjacent pieces of formwork, facing material shall not exceed 1/4 inch.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3.03 FORM REMOVAL

- A. Nonsupporting forms, sides of beams, walls, columns, and similar parts of Work, may be removed after cumulatively curing at not less than 50 degrees F for 24 hours from time of concrete placement if:
 - 1. Concrete is sufficiently hard so as not to sustain damage by form removal operations.
 - 2. Curing and protection operations are maintained.
- B. Elevated Structural Slabs or Beams: In accordance with ACI 318, Chapter 6, and at such time as concrete has reached compressive strength equal to 80 percent of specified 28-day compressive strength as determined by test cylinders.
- C. Form Ties: Remove conical inserts or through bolts and plug holes as specified in Section 03 30 00, Cast-in-Place Concrete.

3.04 FIELD QUALITY ASSURANCE AND QUALITY CONTROL

- A. Contractor-Furnished Quality Control: Inspection and testing as required.

END OF SECTION

SECTION 03 15 00
CONCRETE JOINTS AND ACCESSORIES

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. ASTM International (ASTM):
 - a. A36/A36M, Specification for Carbon Structural Steel.
 - b. A615/A615M, Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
 - c. A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - d. A767/A767M, Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.
 - e. C920, Specification for Elastomeric Joint Sealants.
 - f. D226, Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
 - g. D227, Specification for Coal-Tar Saturated Organic Felt Used in Roofing and Waterproofing.
 - h. D994, Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
 - i. D1056, Specification for Flexible Cellular Materials—Sponge or Expanded Rubber.
 - j. D1171, Standard Guide for Evaluating Nonwoven Fabrics.
 - k. D1751, Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
 - l. D1752, Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
 - m. D2240, Standard Test Method for Rubber Property – Durometer Hardness.
 2. Corps of Engineers (COE): CRD-C-572, Corps of Engineers Specifications for Polyvinylchloride Waterstop.
 3. NSF International (NSF): 61, Drinking Water System Components - Health Effects.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

1.02 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
 - a. Construction Joints, Expansion Joints and Control Joints: Layout and location for each type. Include joint locations shown on the Drawings, additional required joint locations and any proposed alternate locations.
2. Product Data:
 - a. Bond breaker.
 - b. Premolded joint fillers.
 - c. Pourable joint fillers.
 - d. Preformed control joints.
 - e. Epoxy-coated dowels.
 - f. Accessories not specified in other sections.

B. Informational Submittals:

1. Certification: Letter stating compatibility between liquids being contained and materials used for joint fillers.
2. Manufacturer's application instructions for:
 - a. Bonding agent.
 - b. Bond breaker.
3. Manufacturer's written instructions for product shipment, storage, handling, installation/application, and repair for:
 - a. Bond breaker.
 - b. Bonding agent.
 - c. Premolded joint fillers.
 - d. Pourable joint fillers (sealant proportions not required as products used only as a filler).
 - e. Preformed control joints.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Acceptance at Site: Verify delivered materials are in accordance with Specifications, regulatory agencies, and Manufacturer's product data sheets prior to unloading and storing onsite.
- B. Storage: Store materials under tarps to protect from oil, dirt, and sunlight or as required by Manufacturer.

PART 2 PRODUCTS

2.01 BOND BREAKER

- A. Tape for Joints: Adhesive-backed glazed butyl or polyethylene tape. Same width as joint that will adhere to premolded joint material or concrete surface.
- B. Use bond prevention material as specified in Section 03 30 00, Cast-in-Place Concrete, except where bond breaker tape is specifically called for on the Drawings.

2.02 PREMOLDED JOINT FILLER

- A. Bituminous Type: ASTM D994 or ASTM D1751.
- B. Sponge Rubber:
 - 1. Neoprene, closed-cell, expanded; ASTM D1056, Type 2C5, with compression deflection, 25 percent deflection (limits), 119 kPa to 168 kPa (17 psi to 24 psi) minimum. Use in joints for potable and nonpotable water containment structures.
 - 2. Manufacturer and Product: Monmouth Rubber and Plastics, Corp, Long Branch, NJ; Durafoam DK5151.

2.03 POURABLE JOINT FILLERS

- A. General: Although product is a sealant, it is being specified as a filler to prevent debris accumulation and allow expansion and contraction under shrinkage and thermal loads. It does not need to meet proportional sealant geometry requirements.
- B. Filler for Potable or Nonpotable Water Containment Structures:
 - 1. Multicomponent sealant, self-leveling or nonsag as required for level, sloping, or vertical joints.
 - 2. Color: White.
 - 3. Manufacturer and Product: Sika Corp., Lyndhurst, NJ; Sikaflex-2c SL.

2.04 STEEL EXPANSION JOINT DOWELS

- A. Dowels: ASTM A36/A36M round smooth steel bars.
- B. Bar Coating: Bars shall not be coated.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

2.05 ACCESSORIES

- A. Steel Reinforcement: As specified in Section 03 21 00, Steel Reinforcement.
- B. Nails: Galvanized, as required for securing premolded joint filler.

PART 3 EXECUTION

3.01 GENERAL

- A. Commence concrete placement after joint preparation is complete.
- B. Time Between Concrete Pours: As specified in Section 03 30 00, Cast-in-Place Concrete.

3.02 SURFACE PREPARATION

- A. Construction Joints: Prior to placement of abutting concrete, clean contact surface.
 - 1. Remove laitance and spillage from steel reinforcement and dowels.
 - 2. Roughen surface to minimum of 1/4-inch amplitude:
 - a. Sandblast after concrete has fully cured.
 - b. Water blast after concrete has partially cured.
 - c. Green cut fresh concrete with high-pressure water and hand tools.
 - 3. Perform cleaning so as not to damage waterstop, if one is present.
- B. Expansion Joint:
 - 1. Use wire brush or motorized device to mechanically roughen and thoroughly clean concrete surfaces on each side of joint from plastic waterstop to top of joint.
 - 2. Use dry, high-pressure air to remove dust and foreign material, and dry joint.
 - 3. Prime surfaces as required before placing joint filler.
 - 4. Avoid damage to waterstop.
- C. Contraction Joint and Control Joint:
 - 1. Coat concrete surfaces above and below plastic waterstop with bond breaker.
 - 2. Do not damage or coat waterstop.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3.03 EXPANSION JOINT INSTALLATION

A. Premolded Joint Filler:

1. Sufficient in width to completely fill joint space where shown.
2. Install per manufacturer's written instructions.
3. If waterstop is in joint, cut premolded joint filler to butt tightly against waterstop and concrete face.
4. Precut premolded joint filler to required depth at locations where joint filler or sealant is to be applied.
5. Form cavities for joint filler with either precut, premolded joint filler, or smooth removable accurately shaped material. Entire joint above waterstop, in slabs, shall be formed and removed so that entire space down to waterstop can be filled with the pourable joint filler.
6. Vibrate concrete thoroughly along joint form to produce dense, smooth surface.

B. Bituminous Type Premolded Joint Filler:

1. Drive nails approximately 1 foot 6 inches on center through filler, prior to installing, to provide anchorage embedment into concrete during concrete placement.
2. Secure premolded joint filler in forms before concrete is placed.

C. Sponge Rubber Joint Filler: Install per manufacturer's written instructions.

D. Pourable Joint Filler:

1. General:
 - a. Install in accordance with the manufacturer's written instructions, except as specified below:
 - 1) Apply primer prior to pouring joint filler.
 - 2) Fill entire joint above the waterstop with joint filler as shown.
 - 3) Use masking tape on top of slabs at sides of joints; clean spillage. Remove masking tape afterwards.
 - 4) Sealant products used as fillers need not meet sealant geometry parameters. Do not use backing rods.

E. Steel Expansion Joint Dowels:

1. Install coated and lubricated bars parallel to wall or slab surface and in true horizontal position perpendicular to joint in both plan and section view, so as to permit joint to expand or contract without bending dowels.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

2. Secure dowels tightly in forms with rigid ties.
3. Install steel reinforcement in concrete as shown.

3.04 CONTRACTION JOINT INSTALLATION

- A. Place bond breaker above and below waterstop.
- B. Vibrate concrete thoroughly along the joint form to produce a dense, smooth surface. Do not roughen surface.

3.05 CONTROL JOINT INSTALLATION

- A. Locate steel reinforcement as shown.
- B. Vibrate concrete thoroughly along the joint form to produce a dense, smooth surface. Do not roughen surface.

3.06 PREFORMED CONTROL JOINTS

- A. Use only where specifically shown; do not use in water-holding basins.
- B. Locate slightly below top of slab.
- C. Install in accordance with manufacturer's written instructions in straight, full-length pieces.
- D. Steel Strip Type with Preformed Groove: Brace to withstand pressure of concrete during and after placement using only approved stakes and other secondary installation materials.

3.07 MANUFACTURER'S SERVICES

- A. Provide manufacturer's representative at Site for installation assistance, inspection, and certification of proper installation for products specified.

3.08 FIELD QUALITY ASSURANCE AND QUALITY CONTROL

- A. Contractor-Furnished Quality Control: Inspection and testing as required in Section 01 45 16.13, Contractor Quality Control.

END OF SECTION

**SECTION 03 21 00
STEEL REINFORCEMENT**

PART 1 GENERAL

1.01 GENERAL

- A. Steel reinforcement shall comply with ACI 301 and as modified in the following.

1.02 REFERENCES

- A. The following is a list of standards which may be referenced in this section:

1. American Concrete Institute (ACI):
 - a. 117, Specification for Tolerances for Concrete Construction and Materials.
 - b. 301, Specifications for Structural Concrete.
 - c. SP-66, Detailing Manual.
2. American Welding Society (AWS): D1.4/D1.4M, Structural Welding Code - Reinforcing Steel.
3. ASTM International (ASTM):
 - a. A615/A615M, Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
 - b. A706/A706M, Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
4. Concrete Reinforcing Steel Institute (CRSI):
 - a. Placing Reinforcing Bars.
 - b. Manual of Standard Practice.
5. International Code Council (ICC): Evaluation Services Report.

1.03 SUBMITTALS

- A. Action Submittals:

1. Shop Drawings prepared in accordance with ACI 301 and ACI SP-66:
 - a. Bending lists.
 - b. Placing drawings.
2. Metallic sleeve splice and mechanical threaded connection.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

B. Informational Submittals:

1. Lab test reports for steel reinforcement showing stress-strain curves and ultimate strengths.
2. Test results of field testing.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. In accordance with ACI 301 and recommendations of CRSI Placing Reinforcing Bars.

PART 2 PRODUCTS

2.01 MATERIALS

A. Reinforcing Bars:

1. Includes stirrups, ties, and spirals.
2. ASTM A615/A615M, Grade 60, where welding is not required.
3. ASTM A706/A706M, Grade 60, for reinforcing to be welded.

2.02 ACCESSORIES

- A. Tie Wire: Black, soft-annealed 16-gauge wire.

B. Bar Supports and Spacers:

1. Use precast concrete bar supports and side form spacers, unless noted otherwise. Do not use other types of supports or spacers.
2. Bar supports shall have sufficient strength and stiffness to carry loads without failure, displacement, or significant deformation. Space bar supports so minimum concrete cover is maintained for reinforcing between supports.
3. Use only precast concrete bar supports where concrete surfaces are exposed to weather, earth, water, chloride intrusion, or corrosive chemicals. Bar supports shall be nonconductive and have geometry and bond characteristics that deter movement of moisture from the surface to the reinforcement.
4. Precast concrete supports shall have same minimum strength and shall be made from same materials as that of the concrete in which they are to be embedded. Precast concrete supports shall be cast and properly cured for at least 7 days before use and shall have a wire or other device cast into each block for the purpose of attaching them securely to steel reinforcement.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

5. Design and fabricate special bar supports for top reinforcing bars in slabs where standard bar supports do not possess necessary geometry, strength, or stiffness.

PART 3 EXECUTION

3.01 PREPARATION

- A. Notify Construction Manager when reinforcing is ready for inspection and allow sufficient time for inspection prior to placing concrete.
- B. Clean reinforcing bars of loose mill scale, oil, earth, and other contaminants.
- C. Coat wire projecting from precast concrete bar supports with dielectric material, epoxy, or plastic.

3.02 INSTALLATION

- A. Bundle or space bars, instead of field bending where construction access through reinforcing is necessary.
- B. Splicing:
 1. Minimum length of lap splices shall comply with ACI 318.
 2. Use lap splices, unless otherwise shown or permitted in writing by Construction Manager.
 3. Welding reinforcement will not be permitted.
 4. Stagger splices in adjacent bars where indicated.
- C. Tying Reinforcing Bars:
 1. Tie every other intersection on mats made up of Nos. 3, 4, 5, and 6 bars to hold them firmly at required spacing.
 2. Bend tie wire away from concrete surface to provide clearance of 1 inch from surface of concrete to tie wire.
- D. Reinforcement Around Openings: On each side and above and below pipe or opening, place an equivalent area of steel bars to replace steel bars cut for opening. Extend steel reinforcing a standard lap length beyond opening at each end.
- E. Straightening and Rebending: Field bending of steel reinforcement bars is not permitted.
- F. Unless permitted by Construction Manager, do not cut reinforcing bars in field.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3.03 FIELD QUALITY ASSURANCE AND QUALITY CONTROL

- A. Contractor-Furnished Quality Control: Inspection and testing as required in Section 01 45.16.13, Contractor Quality Control.

END OF SECTION

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards that may be referenced in this section:
1. American Concrete Institute (ACI):
 - a. 117, Specification for Tolerances for Concrete Construction and Materials.
 - b. 301, Specifications for Structural Concrete.
 - c. 305.1, Specification for Hot Weather Concreting.
 - d. 306.1, Standard Specification for Cold Weather Concreting.
 - e. 350.1, Specification for Tightness Testing of Environmental Engineering Concrete Containment Structures.
 - f. CP-1, Technical Workbook for ACI Certification of Concrete Field Testing Technician – Grade 1.
 2. ASTM International (ASTM):
 - a. C31/C31M, Standard Practice for Making and Curing Concrete Test Specimens in the Field.
 - b. C33/C33M, Standard Specification for Concrete Aggregates.
 - c. C39/C39M, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 - d. C94/C94M, Standard Specification for Ready-Mixed Concrete.
 - e. C109/C109M, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens).
 - f. C143/C143M, Standard Test Method for Slump of Hydraulic-Cement Concrete.
 - g. C150/C150M, Standard Specification for Portland Cement.
 - h. C157/C157M, Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete.
 - i. C227, Standard Test Method for Potential Alkali Reactivity of Cement-Aggregate Combinations (Mortar-Bar Method).
 - j. C231/C231M, Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
 - k. C260/C260M, Standard Specification for Air-Entraining Admixtures for Concrete.
 - l. C494/C494M, Standard Specification for Chemical Admixtures for Concrete.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- m. C595/C595M, Standard Specification for Blended Hydraulic Cements.
 - n. C618, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
 - o. C881/C881M, Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
 - p. C989, Standard Specification for Slag Cement for Use in Concrete and Mortars.
 - q. C1017/C1017M, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
 - r. C1077, Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation.
 - s. C1218/C1218M, Standard Test Method for Water-Soluble Chloride in Mortar and Concrete.
 - t. E329, Standard Specification for Agencies Engaged in Construction Inspection, Special Inspection, or Testing Materials Used in Construction.
3. National Ready Mixed Concrete Association (NRMCA).

1.02 DEFINITIONS

- A. Contractor's Licensed Design Engineer: Individual representing Contractor who is licensed to practice engineering as defined by statutory requirements of professional licensing laws in state or jurisdiction in which Project is to be constructed.
- B. Defective Area: Surface defects that include honeycomb, rock pockets, indentations, and surface voids greater than 3/16-inch deep, surface voids greater than 3/4 inch in diameter, cracks in liquid containment structures and below grade habitable spaces that are 0.005-inch wide and wider, and cracks in other structures that are 0.010-inch wide and wider, spalls, chips, embedded debris, sand streaks, mortar leakage from form joints, deviations in formed surface that exceed specified tolerances and include but are not limited to fins, form pop-outs, and other projections. At exposed concrete, defective areas also include texture irregularities, stains, and other color variations that cannot be removed by cleaning.
- C. Exposed Concrete: Concrete surface that can be seen inside or outside of structure regardless of whether concrete is above water, dry at all times, or can be seen when structure is drained.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

D. Hot Weather: As defined in ACI 305.1.

E. New Concrete: Less than 60 days old.

1.03 SUBMITTALS

A. Action Submittals:

1. Mix Designs:

- a. Contain proportions of materials and admixtures to be used on Project, signed by mix designer.
- b. Documentation of average strength for each proposed mix design in accordance with ACI 301.
- c. Manufacturer's Certificate of Compliance, for the following:
 - 1) Portland cement.
 - 2) Fly ash.
 - 3) Slag cement.
 - 4) Aggregates, including specified class designation for coarse aggregate.
 - 5) Admixtures.
 - 6) Concrete producer has verified compatibility of constituent materials in design mix.
- d. Test Reports:
 - 1) Cement: Chemical analysis report.
 - 2) Supplementary Cementitious Materials: Chemical analysis report and report of other specified test analyses.
 - 3) Water-Soluble Chloride-Ion Content in Hardened Concrete: Unless otherwise permitted, in accordance with ASTM C1218/C1218M at an age between 28 days and 42 days.
- e. Aggregates:
 - 1) Coarse Aggregate Gradation: List gradings and percent passing through each sieve.
 - 2) Fine Aggregate Gradation: List gradings and percent passing through each sieve.
 - 3) Deleterious substances in fine aggregate per ASTM C33/C33M, Table 2.
 - 4) Deleterious substances in coarse aggregate per ASTM C33/C33M, Table 4.
 - 5) Test Reports:
 - a) Alkali Aggregate Reactivity: Aggregate shall be classified as non-potentially reactive in accordance with paragraph Concrete Mix Design. Include documentation of test results per applicable standards.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- f. Admixtures: Manufacturer's catalog cut sheets and product data sheets for each admixture used in proposed mix designs.
2. Product Data: Specified ancillary materials.
3. Detailed plan for curing and protection of concrete placed and cured in cold weather. Details shall include, but not be limited to, the following:
 - a. Procedures for protecting subgrade from frost and accumulation of ice or snow on reinforcement, other metallic embeds, and forms prior to placement.
 - b. Procedures for measuring and recording temperatures of reinforcement and other embedded items prior to concrete placement.
 - c. Methods for temperature protection during placement.
 - d. Types of covering, insulation, housing, or heating to be provided.
 - e. Curing methods to be used during and following protection period.
 - f. Use of strength accelerating admixtures.
 - g. Methods for verification of in-place strength.
 - h. Procedures for measuring and recording concrete temperatures.
 - i. Procedures for preventing drying during dry, windy conditions.
4. Detailed plan for hot weather placements including curing and protection for concrete placed in ambient temperatures over 80 degrees F. Plan shall include, but not be limited to, the following:
 - a. Procedures for measuring, and recording temperatures of reinforcement and other embedded items prior to concrete placement.
 - b. Use of retarding admixture.
 - c. Methods for controlling temperature of reinforcement and other embedded items and concrete materials before and during placement.
 - d. Types of shading and wind protection to be provided.
 - e. Curing methods, including use of evaporation retardant.
 - f. Procedures for measuring and recording concrete temperatures.
 - g. Procedures for preventing drying during dry, windy conditions.
5. Thermal Control Plan: For concrete sections with a minimum specified dimension that is greater than 2 feet 6 inches.
6. Concrete repair techniques.

B. Informational Submittals:

1. Preinstallation Conference minutes.
2. Concrete Supplier(s) and Certifications: Name and address of each proposed concrete supplier and certifications by National Concrete Ready-Mix Concrete Association and State Department of

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- Transportation. Do not change suppliers after approval by the Construction Manager. Submit 28 days, minimum prior to use.
3. Manufacturer's application instructions for bonding agent and bond breaker.
 4. Manufacturer's Certificate of Compliance to specified standards:
 - a. Bonding agent.
 - b. Bond breaker.
 - c. Repair materials.
 5. Statement of Qualification:
 - a. Batch Plant: Certification as specified herein.
 - b. Mix designer.
 - c. Installer.
 - d. Testing agency.
 6. Field test reports.
 7. Recorded temperature data from concrete placement where specified.
 8. Concrete Delivery Tickets:
 - a. A mix design number shall be assigned to each approved mix design and will be used on all testing documents and truck delivery tickets.
 - b. For each batch of concrete before unloading at Site.
 - c. In accordance with ASTM C94/C94M, including requirements 14.2.1 through 14.2.10.
 - d. Indicate amount of mixing water withheld and maximum amount that may be permitted to be added at Site.
- C. Product Data: Submit manufacturer's product data with application and installation instructions for proprietary material and items, including admixtures, patching compounds, epoxies, grouts, joint systems, curing compounds, dry-shake finish materials, hardeners, sealers, and others as requested by the Construction Manager.
- D. Laboratory Test Reports and Mix Designs: Submit laboratory test reports for concrete materials and mix designs.
- E. Material and Mill Certificates: Provide material and mill certificates as specified herein. Material and mill certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with, or exceeds, specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.
- F. Construction Joints: Submit drawing of proposed construction joints in concrete for beams, slab on grade, structural floors, and walls.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- G. Submit Bonding Agent material, certification of compliance and manufacturer's recommendations to be used on construction joints.
- H. Minutes of preconstruction conference.

1.04 QUALITY ASSURANCE

- A. Concrete construction shall conform to requirements of ACI 117 and ACI 301, except as modified herein.
- B. Qualifications:
 - 1. Batch Plant: NRMCA Program for Certification of Ready-Mixed Concrete Production Facilities or approved equivalent program.
 - 2. Mix Designer: Person responsible for developing concrete mixture proportions certified as NRMCA Concrete Technologist Level 2 or DOT certified mix designer in jurisdiction of the Work. Requirement may be waived if individual is Contractor's Licensed Design Engineer.
 - 3. Testing Agency: Unless otherwise permitted, an independent agency, acceptable to Owner, qualified according to ASTM C1077 and ASTM E329 for testing indicated.
 - a. Where field testing is required of Contractor, personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
 - b. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.
- C. Preinstallation Conference:
 - 1. Required Meeting Attendees:
 - a. Contractor, including pumping, placing and finishing, and curing subcontractors.
 - b. Ready-mix producer.
 - c. Admixture representative.
 - d. Testing and sampling personnel.
 - e. Construction Manager or designee.
 - 2. Schedule and conduct prior to incorporation of respective products into Project. Notify Construction Manager of location and time.
 - 3. Agenda shall include:
 - a. Admixture types, dosage, performance, and redosing at Site.
 - b. Mix designs, test of mixes, and Submittals.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- c. Placement methods, techniques, equipment, consolidation, and form pressures.
 - d. Slump and placement time to maintain slump.
 - e. Finish, curing, and water retention.
 - f. Thermal control plan.
 - g. Protection procedures for weather conditions.
 - h. Other specified requirements requiring coordination.
4. Conference minutes as specified in Section 01 31 19, Project Meetings.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Refer to Drawings for classes and strengths of concrete required.
- B. Cementitious Materials:
 - 1. Cement:
 - a. Portland Cement: Unless otherwise specified, conform to requirements of ASTM C150/C150M.
 - b. Blended Hydraulic Cement:
 - 1) Unless otherwise specified, conform to requirements of ASTM C595/C595M.
 - 2) Portland cement used in blended hydraulic cement, conform to requirements of ASTM C150/C150M.
 - c. Furnish from one source.
 - 2. Supplementary Cementitious Materials (SCM):
 - a. Fly Ash (Pozzolan): Class F fly ash in accordance with ASTM C618, except as modified herein.
 - 1) Shall not be produced from process that has utilized hazardous or potentially hazardous materials.
 - 2) ASTM C618, Table 1, Loss on Ignition: Unless permitted otherwise, maximum 3 percent.
 - b. Slag Cement: In accordance with ASTM C989, Grade 100; ground granulated blast furnace slag or Grade 120.
- C. Aggregates: Furnish from one source for each aggregate type used in a mix design.
 - 1. Normal-Weight Aggregates:
 - a. In accordance with ASTM C33/C33M, except as modified herein.
 - 1) Class Designation: 4S unless otherwise specified.
 - b. Free of materials and aggregate types causing popouts, discoloration, staining, or other defects on surface of concrete.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

2. Fine Aggregates:
 - a. Clean, sharp, natural sand.
 - b. ASTM C33/C33M.
 - c. Limit deleterious substances in accordance with ASTM C33/C33M, Table 2 and as follows:
 - 1) Limit material finer than 75 μm (No. 200) sieve to 3 percent mass of total sample.
 - 2) Limit coal and lignite to 0.5 percent.
 3. Coarse Aggregate:
 - a. Natural gravels, combination of gravels and crushed gravels, crushed stone, or combination of these materials containing no more than 15 percent flat or elongated particles (long dimension more than five times the short dimension).
 - b. Limit deleterious substances in accordance with ASTM C33/C33M, Table 4 for specified class designation.
- D. Admixtures: Unless otherwise permitted, furnish from one manufacturer.
1. Characteristics:
 - a. Compatible with other constituents in mix.
 - b. Contain at most, only trace amount chlorides in solution.
 - c. Furnish type of admixture as recommended by manufacturer for anticipated temperature ranges.
 2. Air-Entraining Admixture: ASTM C260/C260M.
 3. Water-Reducing Admixture: ASTM C494/C494M, Type A or Type D.
 - a. Manufacturers and Products:
 - 1) BASF Admixtures Inc., Shakopee, MN; Pozzolith Series or PolyHeed Series.
 - 2) Euclid Chemical Co., Cleveland, OH; Eucon Series.
 - 3) W. R. Grace & Co., Cambridge, MA; Daracem Series or Mira Series.
 4. Retarding Admixture: ASTM C494/C494M, Type B.
 5. Accelerating Admixture: ASTM C494/C494M, Type C.
 6. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F or Type G.
 - a. Manufacturers and Products:
 - 1) BASF Admixtures Inc., Shakopee, MN; Glenium Series, PS 1460, or Rheobuild 1000.
 - 2) Euclid Chemical Co., Cleveland, OH; Eucon Series or Plastol Series.
 - 3) W. R. Grace & Co., Cambridge, MA; ADVA Series, Daracem Series, or EXP 950.
 7. Plasticizing Admixture: ASTM C1017/C1017M, Type I or Type II.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

8. Corrosion Inhibiting Admixtures: ASTM C1582/C1582M.
 9. Do not use calcium chloride as an admixture.
- E. Water and Ice: Mixing water for concrete and water used to make ice shall be potable water, unless alternative sources of water are permitted.
1. Water from alternative sources shall comply with requirements of ASTM C1602/C1602M, and concentration of chemicals in combined mixing water shall be less than:
 - a. Chloride Content: 500 ppm.
 - b. Sulfate Content as SO_4 : 3,000 ppm.
 - c. Alkalis as $(\text{Na}_2\text{O} + 0.658 \text{ K}_2\text{O})$: 600 ppm.
 - d. Total Solids by Mass: Less than 50,000 ppm.
 2. Limit water cement ratio to the value specified in the mix design. No additional water shall be added to the concrete mix.

2.02 ANCILLARY MATERIALS

A. Bonding Agent:

1. Unless otherwise specified, in accordance with the following:
 - a. ASTM C881/C881M, Type V.
 - b. Two-component, moisture insensitive, 100 percent solids epoxy.
 - c. Consult manufacturer for surface finish, pot life, set time, vertical or horizontal application, and forming restrictions.
 - d. Manufacturers and Products:
 - 1) BASF Building Systems Inc., Shakopee, MN; Concreive Standard LVI.
 - 2) Euclid Chemical Co., Cleveland, OH; Euco # 352 Epoxy System LV.
 - 3) Prime Resins, Conyers, GA; Prime Bond 3000 to 3900 Series.
 - 4) Sika Chemical Corp., Lyndhurst, NJ; Sikadur 32 Hi-Mod.

B. Bond Breaker:

1. Nonstaining type, providing positive bond prevention.
2. Manufacturers and Products:
 - a. Dayton Superior Corporation, Kansas City, KS; EDOCO Clean Lift Bond Breaker.
 - b. Nox-Crete Products Group, Omaha, NE; Silcoselect Select.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

C. Repair Material:

1. Contain only trace amounts of chlorides and other chemicals that can potentially cause steel to oxidize.
2. Where repairs of exposed concrete are required, prepare mockup using proposed repair materials and methods, for confirmation of appearance compatibility prior to use.
3. Obtain Manufacturer's Certificate of Compliance that products selected are appropriate for specific applications.
4. Repair mortar shall be site mixed.
5. Prepare concrete substrate and mix, place, and cure repair material in accordance with manufacturer's written recommendations.
6. Manufacturers and Products:
 - a. BASF Building Systems Inc., Shakopee, MN; EMACO S-Series products.
 - b. Sika Chemical Corp., Lyndhurst, NJ; SikaTop-Series.

2.03 CONCRETE MIX DESIGN

A. General:

1. See Supplements at the end of this section for mix design requirements for each class of concrete used on Project.
2. Prepare design mixtures for each type and strength of concrete, selecting and proportioning ingredients in accordance with requirements of ACI 301, unless otherwise specified.
3. Selection of constituent materials and products in mix design are optional, unless specified otherwise.
4. Unless otherwise permitted, use water-reducing admixture or water-reducing admixture and high-range, water-reducing admixture, or plasticizing admixture in pumped concrete, in concrete with a water-cementitious materials ratio below 0.50.
5. Unless otherwise permitted, use water-reducing admixture and high-range, water-reducing admixture in piers, pilasters, and walls.
6. Use water-reducing admixture or high-range, water-reducing admixture, or plasticizing admixture to achieve fresh properties that facilitate handling, placing, and consolidating of concrete, and specified hardened properties.
7. Use water-reducing and retarding admixture when anticipated high temperatures, low humidity, or other adverse placement conditions can adversely affect fresh properties of concrete.
8. Unless otherwise specified, desired fresh properties of concrete shall be determined by Contractor, and coordinated with concrete producer. Fresh properties of concrete shall remain stable to satisfaction of

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

Contractor, for duration of placement and consolidation, and shall remain in conformance with requirements of Contract Documents.

9. Contractor is encouraged to consider using environmentally sustainable concrete mix design technologies such as use of supplementary cementitious materials and aggregate packing.

B. Potential Alkali-aggregate Reactivity of Concrete:

1. Do not use aggregates known to be susceptible to alkali-carbonate reaction (ACR).
2. Aggregates shall have been tested to determine potential alkali-aggregate reactivity in concrete in accordance with ASTM C1260 or ASTM C1567.
 - a. Aggregates that indicate expansion greater than 0.10 percent at 16 days after casting shall not be used unless they have been shown to be nondeleteriously reactive in accordance with ASTM C227 or ASTM C1293, with less than 0.04 percent expansion at 1 year for cement-aggregate combinations or less than 0.04 percent expansion at 2 years for combinations with pozzolan or slag.
 - b. Alkali content of cement used in proposed concrete mixture shall not be greater than alkali content of cement used in test for potential alkali-aggregate reactivity.
 - c. Use low-alkali cement or incorporate pozzolans into concrete mixture as necessary to satisfy testing for potential alkali reactivity.

C. Provide minimum concentrations of corrosion-inducing chemicals as shown in the table below:

Limits on Corrosion-Inducing Chemicals		
Chemical*	Limits, Percent**	Test Method
Chlorides	0.10	ASTM D512
Fluorides	0.10	ASTM D1179
Sulphites	0.13	ASTM D1339

JACKSONVILLE PORT AUTHORITY
 BLOUNT ISLAND EQUIPMENT WASH FACILITY

Limits on Corrosion-Inducing Chemicals		
Chemical*	Limits, Percent**	Test Method
Nitrates	0.17	ASTM D3867
* Limits refer to water-soluble chemicals. ** Limits are expressed as a percentage of the mass of the total cementitious materials.		

- The total alkali content shall not increase the total sodium-oxide equivalent alkali content of the concrete by more than 0.02 pounds per cubic foot.

D. Proportions:

- Design mix to meet aesthetic, durability, and strength requirements.
- Where fly ash is included in mix, minimum fly ash content shall be a minimum of 15 percent of weight of total cementitious materials.

E. Slump Range at Site:

- Unless otherwise permitted, target slump value is 4 inches at point of delivery, for concrete without high-range, water reducing admixture.
- Design mixes that include a high-range, water-reducing or a plasticizing admixture shall have a minimum slump of 2 inches prior to addition of admixture. Unless otherwise permitted, slump shall be 8-inch maximum at point of delivery, for concrete with a high-range, water-reducing admixture.
- Slump tolerance shall meet requirements of ACI 117.

F. Combined Aggregate Gradation:

- Combined Gradation Limits: Limits shown are for coarse aggregates and fine aggregates mixed together (combined). Select one of the gradations shown in the following table:

Sieve Sizes	Combined Gradation Percentage Passing		
	1-1/2" Max.	1" Max.	3/4" Max.
2"	100	-	-
1-1/2"	95 - 100	100	-
1"	65 - 85	90 - 100	100
3/4"	55 - 75	70 - 90	92 - 100
1/2"	-	-	68 - 86

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

Sieve Sizes	Combined Gradation Percentage Passing		
	1-1/2" Max.	1" Max.	3/4" Max.
3/8"	40 - 55	45 - 65	57 - 74
No. 4	30 - 45	31 - 47	38 - 57
No. 8	23 - 38	23 - 40	28 - 46
No. 16	16 - 30	17 - 35	20 - 36
No. 30	10 - 20	10 - 23	14 - 25
No. 50	4 - 10	2 - 10	5 - 14
No. 100	0 - 3	0 - 3	0 - 5
No. 200	0 - 2	0 - 2	0 - 2

2.04 CONCRETE MIXING

- A. General: In accordance with ACI 301, except as modified herein.
- B. Truck Mixers:
 - 1. For every truck, test slump of samples taken per ASTM C94/C94M, paragraph 12.5.1.
 - 2. Where specified slump is more than 4 inches, and if slump tests differ by more than 2 inches, discontinue use of truck mixer, unless causing condition is corrected and satisfactory performance is verified by additional slump tests.

2.05 TEMPERATURE LIMITS

- A. For concrete sections with a minimum specified dimension that is greater than 2 feet 6 inches, and unless otherwise permitted:
 - 1. Provide documentation that maximum concrete temperature in structure will not exceed 158 degrees F, and maximum temperature differential between center of section and external surfaces of concrete will not exceed 35 degrees F.

2.06 SOURCE QUALITY CONTROL

- A. Source Quality Control Inspection: Construction Manager shall have access to and have right to inspect batch plants, cement mills, and supply facilities of suppliers, manufacturers, and Subcontractors, providing products included in this section.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

PART 3 EXECUTION

3.01 PLACING CONCRETE

- A. Preparation: Meet requirements ACI 301, except as modified herein.
- B. Inspection: Notify Construction Manager and Special Inspector at least 1 full working day in advance before starting to place concrete.
- C. Placement Into Formwork:
 - 1. Reinforcement: Secure in position before placing concrete.
 - 2. Place concrete as soon as possible after leaving mixer, without segregation or loss of ingredients, without splashing forms or steel above, and in layers not over 1.5 feet deep, except for slabs which shall be placed full depth. Place and consolidate successive layers prior to initial set of first layer to prevent cold joints.
 - 3. Placement frequency shall be such that lift lines will not be visible in concrete finishes.
 - 4. Use placement devices, for example chutes, pouring spouts, and pumps as required to prevent segregation.
 - 5. Vertical Free Fall Drop to Final Placement:
 - a. Forms 8 Inches or Less Wide: 5 feet.
 - b. Forms Wider than 8 Inches: 8 feet, except as specified.
 - 6. For placements where drops are greater than specified, use placement device such that free fall below placement device conforms to required value.
 - a. Limit free fall to prevent segregation caused by aggregates hitting steel reinforcement.
 - 7. Do not use aluminum conveying devices.
 - 8. Provide sufficient illumination in the interior of forms so concrete deposition is visible, permitting confirmation of consolidation quality.
 - 9. Joints in Footings and Slabs:
 - a. Ensure space beneath plastic waterstop completely fills with concrete.
 - b. During concrete placement, make visual inspection of entire waterstop area.
 - c. Limit concrete placement to elevation of waterstop in first pass, vibrate concrete under waterstop, lift waterstop to confirm full consolidation without voids, and place remaining concrete to full height of slab.
 - d. Apply procedure to full length of waterstop.
 - 10. Trowel and round off top exposed edges of walls with 1/4-inch radius steel edging tool.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- D. Conveyor Belts and Chutes:
1. Design and arrange ends of chutes, hopper gates, and other points of concrete discharge throughout conveying, hoisting, and placing system for concrete to pass without becoming segregated.
 2. Do not use chutes longer than 50 feet.
 3. Minimum Slopes of Chutes: Angled to allow concrete to readily flow without segregation.
 4. Conveyor Belts:
 - a. Approved by Construction Manager.
 - b. Wipe clean with device that does not allow mortar to adhere to belt.
 - c. Cover conveyor belts and chutes.
- E. Retempering: Not permitted for concrete where cement has partially hydrated.
- F. Pumping of Concrete:
1. Provide standby pump, conveyor system, crane and concrete bucket, or other system onsite during pumping, for adequate redundancy to ensure completion of concrete placement without cold joints in case of primary placing equipment breakdown.
 2. Minimum Pump Hose (Conduit) Diameter: 4 inches.
 3. Replace pumping equipment and hoses (conduits) that are not functioning properly.
- G. Concrete sections with a minimum specified dimension that is greater than 2 feet 6 inches:
1. Cure and protect concrete in accordance with accepted thermal control plan and as follows:
 - a. Minimum curing period shall be 14 days.
 - b. Unless otherwise permitted, preserve moisture by maintaining forms in place.
 2. Strength measurement shall be representative of in-place concrete within 2 inches of concrete surface.
 3. Concrete strength shall be verified through correlation of concrete temperature and compressive strengths established by cylinder compressive tests and in accordance with ASTM C1074.
 4. Unless otherwise specified, control concrete temperatures to within specified limits from time concrete is placed until time internal temperature has cooled from its maximum, such that difference between average daily ambient and maximum internal concrete temperature at

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

time of protection removal, is less than specified temperature difference limit.

5. Unless otherwise specified, place one temperature sensor at center of mass of placement and one temperature sensor at a depth 2 inches from center of nearest exterior surface. Place additional sensor at each location to serve as a backup in event that other temperature sensor fails. In addition, provide temperature sensor in shaded location for monitoring ambient onsite temperature.
 - a. Unless otherwise specified, monitor temperatures hourly using electronic sensors capable of measuring temperature from 32 degrees F to 212 degrees F to an accuracy of 2 degrees F.
 - b. Ensure temperature sensors are operational before placing concrete.
 - c. Unless otherwise specified, provide data from sensors to Construction Manager on a daily basis, until requirements are met.
 - d. Compare temperatures and temperature differences with maximum limits specified in Article Temperature Limits every 12 hours, unless otherwise permitted. If either exceeds specified limits, take immediate action as described in accepted thermal control plan to remedy situation. Do not place additional mass concrete until cause of excessive temperature or temperature difference has been identified and corrections are accepted.

H. Maximum Size of Concrete Placements:

1. Limit size of each placement to allow for strength gain and volume change as a result of shrinkage.
2. Locate expansion, control, and contraction joints where shown on the Drawings.
3. Construction Joints:
 - a. Unless otherwise shown or permitted, locate construction joints as follows:
 - 1) Locate construction joints as shown on the Drawings.
 - 2) Provide vertical construction joints in walls and slabs at maximum spacing of 40 feet, unless shown or approved otherwise.
 - 3) When vertical expansion, contraction, or control joint spacing does not exceed 60 feet, intermediate construction joints are not required.
 - 4) Uniformly space vertical construction joints within straight sections of walls and slabs, avoiding penetrations.
4. Consider beams, girders, brackets, column capitals, and haunches as part of floor or roof system and place monolithically with floor or roof system.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

5. Should placement sequence result in cold joint located below finished water surface, install waterstop in joint.

I. Minimum Time between Adjacent Placements:

1. Construction or Control Joints: 7 days unless otherwise specified.
2. Construction Joint between Top of Footing or Slab, and Column or Wall: As soon as can safely be done without damaging previously cast concrete or interrupting curing thereof, but not less than 24 hours.
3. Expansion or Contraction Joints: 1 day.
4. For columns and walls with a height in excess of 10 feet, wait at least 2 hours before depositing concrete in beams, girders, or slabs supported thereon.
5. For columns and walls 10 feet in height or less, wait at least 1 hour prior to depositing concrete in beams, girders, brackets, column capitals, or slabs supported thereon.

J. Consolidation and Visual Observation:

1. Consolidation Equipment and Methods: ACI 301.
2. Provide at least one standby vibrator in operable condition at Site prior to placing concrete.
3. Provide sufficient windows in forms or limit form height to allow for concrete placement through windows and for visual observation of concrete.
4. Vibrate concrete in vicinity of joints to obtain impervious concrete.

K. Hot Weather:

1. Prepare ingredients, mix, place, cure, and protect in accordance with ACI 301, ACI 305.1, and as follows:
 - a. Maintain concrete temperature below 90 degrees F at time of placement, or furnish test data or other proof that admixtures and mix ingredients do not produce flash set plastic shrinkage, or cracking as a result of heat of hydration. Cool ingredients before mixing to maintain fresh concrete temperatures as specified or less.
 - b. Provide for windbreaks, shading, fog spraying, sprinkling, ice, wet cover, or other means as necessary to maintain concrete at or below specified temperature.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3.02 CONCRETE BONDING

- A. Construction Joints: Install construction joint device as noted on the Drawings in coordination with beam pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.
- B. Construction Joints at Existing Concrete:
 - 1. Thoroughly clean and mechanically roughen existing concrete surfaces to roughness profile of 1/4 inch.
 - 2. Saturate surface with water for 24 hours prior to placing new concrete.

3.03 SURFACE FINISHES EXCEPT SLABS

- A. Defects:
 - 1. Repair formed surfaces by removing minor honeycombs, pits greater than 1 square inch surface area or 0.25 inch maximum depth, or otherwise defective areas.
 - 2. Provide edges perpendicular to the surface and patch with nonshrink grout.
 - 3. Patch tie holes and defects when the forms are removed. Concrete with extensive honeycomb including exposed steel reinforcement, cold joints, entrapped debris, separated aggregate, or other defects that affect the serviceability or structural strength will be rejected, unless correction of defects is approved. Obtain approval of corrective action prior to repair.
 - 4. The surface of the concrete shall not vary more than the allowable tolerances of ACI 347. Exposed surfaces shall be uniform in appearance and finished to a smooth form finish, unless otherwise indicated.
- B. Not Against Forms (Top of Structure): Finish surfaces not otherwise specified with wood floats to even surfaces, and match adjacent finishes.
- C. Formed Surfaces:
 - 1. Tolerances: Formed surfaces tolerances shall conform to ACI 117 and as indicated.
 - 2. As-Cast Rough Form: Provide for surfaces not exposed to public view. Patch holes and defects and level abrupt irregularities. Remove or rub off fins and other projections exceeding 0.25 inch in height.
 - 3. As-Cast Form: Provide form facing material producing a smooth, hard, uniform texture on the concrete. Arrange facing material in an orderly and symmetrical manner and keep seams to a practical minimum. Support forms as necessary to meet required tolerances. Material with

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

raised grain, torn surfaces, worn edges, patches, dents, or other defects which will impair the texture of the concrete surface shall not be used. Patch tie holes and defects and completely remove fins.

3.04 FINISHES FOR HORIZONTAL CONCRETE SURFACES

- A. General: Finish for horizontal concrete surfaces shall conform to ACI 301. Place, consolidate, and immediately strike off concrete to obtain proper contour, grade, and elevation before bleed water appears. Permit concrete to attain a set sufficient for floating and supporting the weight of the finisher and equipment. If bleed water is present prior to floating the surface, drag excess water off or remove by absorption with porous materials. Do not use dry cement to absorb bleed water.
- B. Scratched: Use for surfaces intended to receive bonded applied cementitious applications. After the concrete has been placed, consolidated, struck off, and leveled, the surface shall be roughened with stiff brushes or rakes before final set.
- C. Broomed: Perform a floated finish, then draw a broom or burlap belt across the surface to produce a coarse scored texture. Permit surface to harden sufficiently to retain the scoring or ridges. Broom transverse to traffic or at right angles to the slope of the slab.

3.05 BACKFILL AGAINST STRUCTURES

- A. Do not backfill against walls until concrete has obtained specified 28-day compressive strength.
- B. Refer to General Structural Notes on the Drawings for additional requirements, including elevated slab and diaphragm completion prior to backfill.
- C. Unless otherwise permitted, place backfill simultaneously on both sides of structure, where such fill is required, to prevent differential pressures.

3.06 FIELD QUALITY CONTROL

- A. General:
 - 1. Provide adequate facilities for safe storage and proper curing of concrete test specimens onsite for first 24 hours, and for additional time as may be required before transporting to test lab.
 - 2. Unless otherwise specified, sample concrete for testing for making test specimens, from point of delivery.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3. When concrete is pumped, sample and test air content at point of delivery and at point of placement.
 - a. For Each Concrete Mixture: Provided results of air content tests for first load of the day are within specified limits, testing need only be performed at point of delivery for subsequent loads of that concrete mixture except that testing should be performed at point of placement every 4 hours.
4. Evaluation will be in accordance with ACI 301 and Specifications.
5. Test specimens shall be made, cured, and tested in accordance with ASTM C31/C31M and ASTM C39/C39M.
6. Provide test for each type of concrete placed each day over 5 yards and additional tests for each additional 50 yards placed. Frequency of testing may be changed at discretion of Construction Manager.
7. Pumped Concrete: Take concrete samples for slump, ASTM C143/C143M, and test specimens, ASTM C31/C31M and ASTM C39/C39M, at placement (discharge) end of line.
8. If measured air content at delivery is greater than specified limit, check test of air content will be performed immediately on a new sample from delivery unit. If check test fails, concrete has failed to meet requirements of Contract Documents. If measured air content is less than lower specified limit, adjustments will be permitted in accordance with ASTM C94/C94M, unless otherwise specified. If check test of adjusted mixture fails, concrete has failed to meet requirements of Contract Documents. Concrete that has failed to meet requirements of Contract Documents shall be rejected.

B. Concrete Strength Test:

1. Unless otherwise specified, one specimen at age of 7 days for information, and two 6-inch diameter specimens at age of 28 days for acceptance.
2. If result of 7-day concrete strength test is less than 50 percent of specified 28-day strength, extend period of moist curing, by 7 additional days.
3. Provide a minimum of one spare test specimen per sample. Test spare cylinder as directed by Construction Manager.
4. Make one additional cylinder during cold weather concreting, and field cure.

C. Chloride Ion Content Test:

1. Sampling and determination of water soluble chloride ion content in accordance with ASTM C1218. Maximum water soluble chloride ion concentrations in hardened concrete at ages from 28 days to 42 days

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

contributed from the ingredients including water, aggregates, cementitious materials, and admixtures shall not exceed the limits of the table below:

Maximum Chloride Ion Content for Corrosion Protection	
Type of Member	Maximum water soluble chloride ion (Cl) in concrete, percent by weight of cement
Reinforced concrete exposed to chloride in service	0.08
Reinforced concrete that will be dry or protected from moisture in service	0.15
Other reinforced concrete construction	0.30

2. Sampling and determination of chloride ion penetration (ponding test) in accordance with AASHTO T259.
3. Submit test results for evaluation and acceptance.

3.07 MANUFACTURER'S SERVICES

- A. Provide representative at for installation assistance, inspection, and certification of proper installation for concrete ingredients, mix design, mixing, and placement.
 1. Concrete Producer Representative:
 - a. Observe how concrete mixes are performing.
 - b. Be present during first placement of each type of concrete mix.
 - c. Assist with concrete mix design, performance, placement, weather problems, and problems as may occur with concrete mix throughout Project, including instructions for redosing.
 - d. Establish control limits on concrete mix designs.
 - e. Provide equipment for control of concrete redosing for air entrainment or high-range, water-reducing admixture, superplasticizers, at Site to maintain proper slump and air content if needed.
 2. Admixture Manufacturer's Representative: Available for consultations as required to ensure proper installation and performance of specified products.
 3. Bonding Agent Manufacturer's Representative: Available for consultations as required to ensure proper installation and performance of specified products.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3.08 PROTECTION OF INSTALLED WORK

- A. Repair areas damaged by construction, using specified repair materials and approved repair methods.

3.09 SUPPLEMENTS

- A. Requirements of concrete mix designs following “End of Section,” are a part of this Specification and supplement requirements of Part 1 through Part 3 of this section:
 - 1. Concrete Mix Design, Class 5000F3S1P2C2.
 - 2. Concrete Mix Design, Class 4500F1S1P0C1.

END OF SECTION

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

CONCRETE MIX DESIGN, CLASS 5000F0S1W2C2

- A. Mix Locations: Typical maritime structural, unless otherwise specified.
- B. Exposure Categories and Classifications: F0S1W2C2.
- C. Mix Properties:
 - 1. Limit water to cementitious materials ratio (W/Cm) in mix design to maximum value of 0.40.
 - 2. Minimum concrete compressive strength (f'c) shall be 4,000 psi at 7 days and 5,000 psi at 28 days.
 - 3. Air-entraining admixtures are prohibited in concrete mixtures and total air content shall not be greater than 3 percent, for the following:
 - a. Slabs to receive hard-troweled finish.
 - b. Slabs to receive dry shake floor hardener.
 - c. Slabs to receive topping placed monolithically as two-course floor on top of plastic concrete.
 - 4. Unless otherwise specified, provide air content based on nominal maximum size of aggregate as follows:

Nominal Maximum Aggregate Size in.‡	Air Content (%)*
3/8	7.5
1/2	7.0
3/4	6.0
1	6.0
1-1/2	5.5
2§	5.0

JACKSONVILLE PORT AUTHORITY
 BLOUNT ISLAND EQUIPMENT WASH FACILITY

Nominal Maximum Aggregate Size in.‡	Air Content (%)*
3§	4.5
‡See ASTM C33/C33M for tolerance on oversize for various nominal maximum size designations. *Tolerance of air content is +1-1/2 percent. §Air contents apply to total mixture. When testing concretes, however, aggregate particles larger than 1-1/2 inches are to be removed by sieving and air content will be measured on sieved fraction (tolerance on air content as delivered applies to this value). Air content of total mixture is computed from value measured on the sieved fraction passing the 1-1/2-inch sieve in accordance with ASTM C231/C231M.	

5. Limit supplementary cementitious materials measured as a percent of weight of total cementitious materials in mix design, as follows:
 - a. Fly Ash and other Pozzolans: 25 percent.
 - b. Slag Cement: 50 percent.
 - c. Combined Fly Ash and other Pozzolans and Slag Cement: 50 percent, with fly ash and other pozzolans not exceeding 25 percent.
 - d. Combined Fly Ash and other Pozzolans: 35 percent, with fly ash and other pozzolans not exceeding 25 percent.
 - e. Total cementitious materials include ASTM C150/C150M and ASTM C595/C595M cement.
 - 1) Fly ash and other pozzolans in Type IP, blended cement, ASTM C595/C595M.
 - 2) Slag used in the manufacture of an IS blended cement, ASTM C595/C595M.

6. Provide cementitious materials in accordance with one of the following:
 - a. ASTM C150/C150M Type II; inclusion of supplementary cementitious materials in design mix is optional.
 - b. ASTM C150/C150M types other than Type II, plus supplementary cementitious materials in accordance with one of the following:
 - 1) Tricalcium Aluminate Content of Total Cementitious Materials: Maximum 8 percent by weight.
 - 2) Provide documentation of test results in accordance with ASTM C1012/C1012M, for combinations of cementitious materials providing sulfate resistance with expansion less than 0.10 percent at 6 months.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- c. ASTM C595/C595M Type IP or Type IS (less than 70), tested to comply with moderate sulfate resistance option (MS).
 - 1) Provide documentation of test results in accordance with ASTM C1012/C1012M, for combinations of cementitious materials providing sulfate resistance with expansion less than 0.10 percent at 6 months.
 - 7. Unless otherwise permitted, minimum cementitious materials content in mix design shall be as follows:
 - a. 515 pounds per cubic yard for concrete with 1-1/2-inch nominal maximum size aggregate.
 - b. 535 pounds per cubic yard for 1-inch nominal maximum size aggregate.
 - c. 560 pounds per cubic yard for 3/4-inch nominal maximum size aggregate.
 - d. 580 pounds per cubic yard for 1/2-inch nominal maximum size aggregate.
 - e. 600 pounds per cubic yard for 3/8-inch nominal maximum size aggregate.
 - f. Unless otherwise permitted, limit cementitious materials content to 100 pounds per cubic yard greater than specified minimum cementitious materials content in mix design.
 - 8. Limit water-soluble, chloride-ion content in hardened concrete to 0.10 percent, unless otherwise specified.
 - a. Limits are stated in terms of chloride ions in percent by weight of cement.
 - b. Unless otherwise permitted, provide documentation from concrete tested in accordance with ASTM C1218/C1218M at an age between 28 days and 42 days.
- D. Refer to Part 1 through Part 3 of this section for additional requirements.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

CONCRETE MIX DESIGN, CLASS 4500F0S1W1C2

- A. Mix Locations:
1. Electrical duct banks.
 2. Pipe encasements that are not cast monolithically with concrete base mats or slabs.
 3. Building Foundations.
- B. Exposure Categories and Classifications: F0S1W1C2.
- C. Mix Properties:
1. Limit water to cementitious materials ratio (W/Cm) in mix design to maximum value of 0.45.
 2. Minimum concrete compressive strength (f'c) shall be 4,000 psi at 28 days.
 3. Air-entraining admixtures are prohibited in concrete mixtures and total air content shall not be greater than 3 percent, for the following:
 - a. Slabs to receive hard-troweled finish.
 - b. Slabs to receive dry shake floor hardener.
 - c. Slabs to receive topping placed monolithically as two-course floor on top of plastic concrete.
 4. Unless otherwise specified, provide air content based on nominal maximum size of aggregate as follows:

Nominal Maximum Aggregate Size in. ‡	Air Content (%)*
3/8	6.0
1/2	5.5
3/4	5.0
1	4.5
1-1/2	4.5
2 [§]	4.0

JACKSONVILLE PORT AUTHORITY
 BLOUNT ISLAND EQUIPMENT WASH FACILITY

Nominal Maximum Aggregate Size in. ‡	Air Content (%)*
3§	3.5
‡See ASTM C33/C33M for tolerance on oversize for various nominal maximum size designations. *Tolerance of air content is $\pm 1-1/2$ percent. §Air contents apply to total mixture. When testing concretes, however, aggregate particles larger than 1-1/2 inches are to be removed by sieving and air content will be measured on the sieved fraction (tolerance on air content as delivered applies to this value). Air content of total mixture is computed from value measured on the sieved fraction passing the 1-1/2-inch sieve in accordance with ASTM C231/C231M.	

5. Provide cementitious materials in accordance with one of the following:
 - a. ASTM C150/C150M Type II; inclusion of supplementary cementitious materials in design mix is optional.
 - b. ASTM C150/C150M types other than Type II, plus supplementary cementitious materials in accordance with one of the following:
 - 1) Tricalcium Aluminate Content of Total Cementitious Materials: Maximum 8 percent by weight.
 - 2) Provide documentation of test results in accordance with ASTM C1012/C1012M, for combinations of cementitious materials providing sulfate resistance with expansion less than 0.10 percent at 6 months.
 - 3) ASTM C595/C595M Type IP or Type IS (less than 70), tested to comply with moderate sulfate resistance option (MS).
 6. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent, unless otherwise specified.
- D. Limits are stated in terms of chloride ions in percent by weight of cement.
- E. Unless otherwise permitted, provide documentation from concrete tested in accordance with ASTM C1218/C1218M at an age between 28 days and 42 days.
- F. Refer to Part 1 through Part 3 of this section for additional requirements.

**SECTION 03 39 00
CONCRETE CURING**

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Concrete Institute (ACI): 308.1, Specification for Curing Concrete.
 2. ASTM International (ASTM):
 - a. C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - b. C1315, Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.
 3. NSF International: 61, Drinking Water System Components – Health Effects.

1.02 SUBMITTALS

- A. Action Submittals:
1. Manufacturers' data indicating compliance with the requirements specified herein for the following products:
 - a. Evaporation retardant.
 - b. Curing compound.
 - c. Penetrating water repellent sealer.
 - d. Clear liquid densifier.
 2. Curing methods proposed for each type of element such as slab, walls, beams, and columns in each facility.
- B. Informational Submittals:
1. Manufacturer's Certificate of Compliance, in accordance with Section 01 61 00, Common Product Requirements, for the following:
 - a. Curing compound showing moisture retention requirements.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

PART 2 PRODUCTS

2.01 MATERIALS

A. Curing Compound:

1. Water-based, high-solids content, nonyellowing, curing compound meeting requirements of ASTM C1315, Class A.
2. Manufacturers and Products:
 - a. Euclid Chemical Co., Cleveland, OH; Super Diamond Clear VOX.
 - b. WR Meadows, Inc., Hampshire, IL; VOCOMP-30.
 - c. Vexcon Chemical, Inc.; Philadelphia, PA; Starseal 1315.
 - d. Dayton Superior; Safe Cure and Seal 1315 EF.
 - e. BASF Construction Chemicals., Shakopee, MN; MasterKure CC 200WB.
 - f. Euclid Chemical Co., Cleveland, OH; EucoCure VOX.
 - g. Euclid Chemical Co., Cleveland, OH; Kurez VOX White Pigmented.

B. Evaporation Retardant:

1. Optional: Fluorescent fugitive dye color tint that disappears completely upon drying.
2. Manufacturers and Products:
 - a. BASF Construction Chemicals, Shakopee, MN; MasterKure ER 50.
 - b. Euclid Chemical Co., Cleveland, OH; Eucobar.

C. Penetrating Water Repellent Sealer: Water based, ready to use, single component, silane/siloxane, penetrating, clear water repellent sealer.

1. Viscosity: 50 cps.
2. Flash Point: 200 degrees F.
3. NCHRP No. 244 Reduction in Chloride Content:
 - a. Average: 82 percent.
 - b. Minimum Required: 75 percent.
4. NCHRP No. 244 Reduction in Weight Gain:
 - a. 21 Days: 85 percent.
 - b. VOCs: 50 g/l.
 - c. Depth of Penetration: 1/4 inch.
5. Manufacturers and Products:
 - a. BASF Construction Chemicals, Shakopee MN; MasterProtect H 400.
 - b. Euclid Chemical Co.; Baracade WB 244.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- D. Clear Liquid Densifier:
 - 1. Colorless, aqueous solution of magnesium fluorosilicate.
 - 2. Each gallon of solution shall contain a minimum of 2 pounds of fluorosilicate compound.
 - 3. Manufacturers and Products:
 - a. BASF Construction Chemicals, Shakopee, MN; MasterKure HD 300WB.
 - b. Euclid Chemical Co., Cleveland, OH; Surfhard.
- E. Water: Clean and potable, containing less than 500 ppm of chlorides.

PART 3 EXECUTION

3.01 CONCRETE CURING

- A. General:
 - 1. Cure all concrete in accordance with project specifications and ACI 308.1.
 - 2. Where surfaces are to receive coatings, painting, cementitious material, or other similar finishes, use only water curing procedures. Refer to Interior Finish Schedule for surfaces to receive coatings.
 - 3. Use only water curing on potable water structures.
 - 4. Where curing compound cannot be used, water curing as described below or special methods using moisture shall be agreed upon by Construction Manager prior to placing concrete.
 - 5. As required in Section 03 30 00, Cast-in-Place Concrete, if result of 7-day concrete strength test is less than 50 percent of specified 28-day strength, extend period of moist curing specified below, by 7 additional days.
- B. Use one of the following methods as approved by Construction Manager:
 - 1. Vertical Surfaces:
 - a. Method 1: Leave concrete forms in place and keep surfaces of forms and concrete wet for 7 days.
 - b. Method 2: Continuously sprinkle with water 100 percent of exposed surfaces for 7 days starting immediately after removal of forms.
 - c. Method 3: Apply curing compound, where allowed, immediately after removal of forms.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

2. Horizontal Surfaces:
 - a. Method 1: Protect surface by water ponding for 7 days.
 - b. Method 2: Cover with burlap or cotton mats and keep continuously wet for 7 days.
 - c. Method 3: Cover with 1-inch layer of wet sand, earth, or sawdust, and keep continuously wet for 7 days.
 - d. Method 4: Continuously sprinkle exposed surface for 7 days.
 - e. Method 5: Apply curing compound, where allowed, immediately after final finishing when surface will no longer be damaged by traffic.

3.02 MANUFACTURER'S SERVICES

- A. Provide manufacturer's representative at Site for installation assistance, inspection, and certification of proper installation for products specified.
- B. Provide penetrating water repellent sealer manufacturer's representative to demonstrate proper application of product.
- C. Provide clear liquid densifier manufacturer's representative to demonstrate proper mixing and application of product.
- D. Provide curing compound manufacturer's representative to demonstrate proper application of curing compound to show coverage in one coat.
- E. Provide retardant for exposed aggregate surfaces manufacturer's representative to demonstrate proper application and surface mortar removal procedures.

END OF SECTION

SECTION 03 62 00
GROUTING

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. ASTM International (ASTM):
 - a. C230, Standard Specification for Flow Table for Use in Tests of Hydraulic Cement.
 - b. C307, Standard Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacing.
 - c. C531, Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
 - d. C579, Standard Test Methods for Compressive Grout Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
 - e. C882, Standard Test Method for Bond Strength of Epoxy-Resin Systems Used With Concrete By Slant Shear.
 - f. C939, Standard Test Method for Flow of Grout for Preplaced-Aggregate Concrete (Flow Cone Method).
 - g. C940, Standard Test Method for Expansion and Bleeding of Freshly Mixed Grouts for Preplaced-Aggregate Concrete in the Laboratory.
 - h. C1107/C1107M, Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
 - i. C1181, Standard Test Methods for Compressive Creep of Chemical-Resistant Polymer Machinery Grouts.
 - j. D4263, Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.

1.02 SUBMITTALS

- A. Action Submittals:
1. Product data of grouts.
 2. Proposed method for keeping existing concrete surfaces wet prior to placing nonshrink grout.
 3. Forming method for fluid grout placements.
 4. Curing method for grout.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

B. Informational Submittals:

1. Manufacturer's Written Instructions: Mixing of grout.
2. Manufacturer's proposed training schedule for grout work.
3. Manufacturer's Certificate of Compliance in accordance with Section 01 61 00, Common Product Requirements.
 - a. Grout free from chlorides and other corrosion-causing chemicals.
 - b. Nonshrink grout properties of Category II and Category III, verifying expansion at 3 days or 14 days will not exceed the 28-day expansion and nonshrink properties are not based on gas or gypsum expansion.
4. Manufacturer's Certificate of Proper Installation.
5. Statements of Qualification: Grout manufacturer's representative.
6. Test Reports:
 - a. Test report for 24-hour evaluation of nonshrink grout.
 - b. Test results and service report from demonstration and training session.
 - c. Field test reports and laboratory test results for field-drawn Samples.
7. List of Contractor's equipment installation staff trained by grout manufacturer's representative in:
 - a. Nonshrink grout installation and curing.
 - b. Epoxy grout installation and curing.

1.03 QUALIFICATIONS

- A. Grout Manufacturer's Representative: Authorized and trained representative of grout manufacturer. Minimum of 5-year experience that has resulted in successful installation of grouts similar to those for this Project.
- B. For grout suppliers not listed herein, provide completed 24-hour Evaluation of Nonshrink Grout Test Form, attached at the end of this section. Provide independent testing laboratory test results for testing conducted within last 18 months.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

PART 2 PRODUCTS

2.01 NONSHRINK GROUT AND EPOXY GROUT SCHEDULE

A. Furnish nonshrink grout (Category I, II, and III) and epoxy grout for applications as indicated in the following schedule:

Application	Temperature Range	Max. Placing Time	
	40 deg F to 100 deg F	20 Min.	Greater Than 20 Min.
Precast joints	I or II		II
Form Tie-Through bolt openings	II	II	II
Baseplates and/or soleplates with vibration, thermal movement, etc.	III or Epoxy Grout	III or Epoxy Grout	III or Epoxy Grout

2.02 NONSHRINK GROUT

A. Category I:

1. Nonmetallic and nongas-liberating.
2. Prepackaged natural aggregate grout requiring only the addition of water.
3. Test in accordance with ASTM C1107/C1107M:
 - a. Grout shall have flowable consistency.
 - b. Flowable for 15 minutes.
4. Grout shall not bleed at maximum allowed water.
5. Minimum strength of flowable grout, 3,000 psi at 3 days, 5,000 psi at 7 days, and 7,000 psi at 28 days.
6. Manufacturers and Products:
 - a. BASF Building System, Inc., Shakopee, MN; MasterFlow 100.
 - b. Euclid Chemical Co., Cleveland, OH; NS Grout.
 - c. Dayton Superior Corp., Miamisburg, OH; 1107 Advantage Grout.
 - d. US MIX Co., Denver, CO; US SPEC GP Grout.
 - e. Five Star Products Inc., Fairfield, CT; Five Star Grout.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

B. Category II:

1. Nonmetallic, nongas-liberating.
2. Prepackaged natural aggregate grout requiring only the addition of water.
3. Aggregate shall show no segregation or settlement at fluid consistency at specified times or temperatures.
4. Test in accordance with ASTM C1107/C1107M:
 - a. Fluid consistency 20 seconds to 30 seconds in accordance with ASTM C939.
 - b. Temperatures of 40 degrees F, 80 degrees F, and 90 degrees F.
5. 1 hour after mixing, pass fluid grout through flow cone with continuous flow.
6. Minimum strength of fluid grout, 3,500 psi at 1 day, 4,500 psi at 3 days, and 7,500 psi at 28 days.
7. Maintain fluid consistency when mixed in 1-yard to 9-yard loads in ready-mix truck.
8. Manufacturers and Products:
 - a. BASF Building Systems, Inc., Shakopee, MN; MasterFlow 928.
 - b. Five Star Products Inc., Fairfield, CT; Five Star Fluid Grout 100.
 - c. Euclid Chemical Co., Cleveland, OH; Hi Flow Grout.
 - d. Dayton Superior Corp., Miamisburg, OH; Sure Grip High Performance Grout.
 - e. US MIX Co., Denver, CO; US SPEC MP Grout.

C. Category III:

1. Metallic and nongas-liberating.
2. Prepackaged aggregate grout requiring only the addition of water.
3. Aggregate shall show no segregation or settlement at fluid consistency at specified times or temperatures.
4. Test in accordance with ASTM C1107/C1107M:
 - a. Fluid consistency 20 seconds to 30 seconds in accordance with ASTM C939.
 - b. Temperatures of 40 degrees F and 100 degrees F.
5. 1 hour after mixing, pass fluid grout through flow cone with continuous flow.
6. Minimum strength of fluid grout, 4,000 psi at 1 day, 5,000 psi at 3 days, and 9,000 psi at 28 days.
7. Maintain fluid consistency when mixed in 1-yard to 9-yard loads in ready-mix truck.
8. Manufacturer and Product:
 - a. BASF Building Systems, Inc., Shakopee, MN; MasterFlow 885.
 - b. Euclid Chemical Co, Cleveland, OH; Hi-Flow Metallic Grout.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

2.03 EPOXY GROUT

- A. High-strength, nonshrink, high-temperature epoxy grouting material developed for the support of heavy equipment with vibratory loads.
- B. Three-component mixture of a two-component epoxy resin system (100 percent solids) with a graded, precision aggregate blend.
- C. Premeasured, prepackaged system.
- D. Flowable.
- E. Minimum compressive strength in accordance with ASTM C579 Method B, 9,500 psi at 75 degrees F at 7 days, 11,000 psi at post cure.
- F. Maximum creep resistance in accordance with ASTM C1181 at 600 psi, 140 degrees F; 6.0×10^{-3} in/in.
- G. Minimum bond strength in accordance with ASTM C882, 2,000 psi.
- H. Minimum tensile strength in accordance with ASTM C307, 2,000 psi.
- I. Maximum coefficient of thermal expansion in accordance with ASTM C531 at 73 degrees F to 210 degrees F, 23.0×10^{-6} in/in/degrees F.
- J. Working Time: Minimum 2 hours at 50 degrees F; 1.5 hours at 70 degrees F; 50 minutes at 90 degrees F.
- K. Good chemical resistance.
- L. Good effective bearing area.
- M. Noncorrosive.
- N. Moisture insensitive.
- O. Modify resin and aggregate content where recommended by epoxy grout manufacturer to provide desired epoxy grout flow properties.
- P. Manufacturers and Products:
 - 1. BASF Building System, Inc., Shakopee MN; MasterFlow 648.
 - 2. Euclid Chemical Co., Cleveland, OH; E³-G.
 - 3. Dayton Superior Corp., Miamisburg, OH; Pro-Poxy 2000 Normal Set.
 - 4. Five Star Products Inc., Fairfield, CT; DP Epoxy Grout.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

PART 3 EXECUTION

3.01 GROUT

- A. General: Mix, place, and cure grout in accordance with grout manufacturer's representative's training instructions.
- B. Epoxy Grout: Concrete slab shall be fully cured for 28 days to ensure excess water has evaporated. Test concrete surface for moisture in accordance with ASTM D4263 before epoxy grout is placed.

3.02 GROUTING MACHINERY FOUNDATIONS

- A. Block out original concrete or finish off at distance shown below bottom of machinery base with grout. Prepare concrete surface by sandblasting, chipping, or by mechanical means to remove any soft material. Surface roughness in accordance with manufacturer's written instructions.
- B. Clean metal surfaces of all paint, oil, grease, loose rust, and other foreign material that will be in contact with grout.
- C. Sandblast to bright metal all metal surfaces in contact with epoxy grout in accordance with manufacturer's written instructions.
- D. Set machinery in position and wedge to elevation with steel wedges, or use cast-in leveling bolts. Remove wedges after grout is set and pack void with grout.
- E. Form with watertight forms at least 2 inches higher than bottom of plate.
- F. Fill space between bottom of machinery base and original concrete in accordance with manufacturer's representative's training instructions.
- G. If grout cannot be placed from one edge and flowed to the opposite edge, air vents shall be provided through the plate to prevent air entrapment.
- H. Radius all corners of grout pad.
- I. Install expansion joints for epoxy grout placement in accordance with manufacturer's written instructions.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3.03 FIELD QUALITY CONTROL

A. General:

1. Performed by Project representative's inspection staff.
2. Perform the following quality control inspections. The grout manufacturer's representative shall accompany the Project representative's inspection staff on the first installation of each size and type of equipment.

B. Evaluation and Acceptance of Nonshrink Grout:

1. Inspect the surface preparation of concrete substrates onto which nonshrink grout materials are to be applied, for conformance to the specified application criteria including, but not limited to, substrate profile, degree of cleanliness, and moisture.
2. Inspect preparation and application of nonshrink grout form work for conformance to the manufacturer's recommendations.
3. Conduct a final review of completed nonshrink grout installation for conformance to these Specifications.
4. Provide a flow cone and cube molds with restraining plates onsite. Continue tests during Project as demonstrated by grout manufacturer's representative.
5. Perform flow cone and bleed tests, and make three 2-inch by 2-inch cubes for each 25 cubic feet of each type of nonshrink grout used. Use restraining caps for cube molds in accordance with ASTM C1107/C1107M.
6. For large grout applications, make three additional cubes and one more flow cone test. Include bleed test for each additional 25 cubic feet of nonshrink grout placed.
7. Consistency: As specified in Article Nonshrink Grout. Flow cone test in accordance with ASTM C939. Grout with consistencies outside range requirements shall be rejected.
8. Segregation: As specified in Article Nonshrink Grout. Grout when aggregate separates shall be rejected.
9. Nonshrink grout cubes shall test equal to or greater than minimum strength specified.
10. Strength Test Failures: Nonshrink grout work failing strength tests shall be removed and replaced.
11. Perform bleeding test in accordance with ASTM C940 to demonstrate grout will not bleed.
12. Store cubes at 70 degrees F.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

13. Independent testing laboratory shall prepare, store, cure, and test cubes in accordance with ASTM C1107/C1107M.
14. All grout, already placed, which fails to meet the requirements of these Specifications, is subject to removal and replacement at no additional cost to the Owner.

C. Evaluation and Acceptance of Epoxy Grout:

1. Inspect ambient conditions during various phases of epoxy grouting installation for conformance with the epoxy grout manufacturer's requirements.
2. Inspect the surface preparation of concrete substrates onto which epoxy grout materials are to be applied, for conformance to the specified application criteria including, but not limited to, substrate profile, degree of cleanliness, and moisture.
3. Inspect the surface preparation of the metallic substrates onto which the epoxy primer is to be applied.
4. Inspect the epoxy-primed metallic substrate for coverage and adhesion.
5. Inspect preparation and application of epoxy grout form work for conformance to the manufacturer's recommendation.
6. Verify consistency obtained is sufficient for the proper field placement at the installed temperatures.
7. Inspect and record that the "pot life" of epoxy grout materials is not exceeded during the installation.
8. Inspect epoxy grout for cure.
9. Inspect and record that localized repairs made to grout voids are in conformance with the specification requirements.
10. Conduct a final review of completed epoxy grout installation for conformance to these Specifications.
11. Compression tests and fabrication of specimens for epoxy grout shall be made in accordance to ASTM C579, Method B, at intervals during construction as selected by the Project representative. A set of three specimens shall be made for testing at 7 days, and each earlier time period as appropriate.
12. Independent testing laboratory shall prepare, store, cure, and test cubes in accordance with ASTM C579.
13. All grout, already placed, which fails to meet the requirements of these Specifications, is subject to removal and replacement at no additional cost to the Owner.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3.04 MANUFACTURER'S SERVICES

A. General:

1. Coordinate demonstrations, training sessions, and applicable Site visits with grout manufacturer's representative. Allow 2-week notice to grout manufacturer's representative for scheduling purposes.
2. Provide and conduct onsite, demonstration and training sessions for bleed tests, mixing, flow cone measurement, cube testing, application, and curing for each category and type of grout.
3. Necessary equipment and materials shall be available for demonstration.
4. Conduct training prior to equipment mount installation work on equipment pads.
5. Training for each type of grout shall be not less than 4 hours' duration.

B. Nonshrink Grout Training:

1. Training is required for all Type II and Type III grout installations.
2. Provide nonshrink grout installation training by the qualified grout manufacturer's representative for Contractor's workers that will be installing nonshrink grout for baseplates and equipment mounts. Schedule training to allow Construction Manager's attendance.
3. Mix nonshrink grouts to required consistency, test, place, and cure on actual Project, such as, baseplates and form tie-through bolt holes to provide actual on-the-job training.
4. Use minimum of two bags for each grout Category II and Category III. Mix grout to fluid consistency and conduct flow cone and two bleed tests, make a minimum of six cubes for testing of two cubes at 1 day, 3 days, and 28 days. Use remaining grout for final Work.
5. Include recommended grout curing methods in the training.
6. Transport test cubes to independent test laboratory and obtain test reports.
7. Training by manufacturer's representative does not relieve Contractor of overall responsibility for this portion of the Work.
8. Submit a list of attendees that have been satisfactorily trained to perform epoxy grout installation for equipment mounting.

C. Epoxy Grout Training:

1. Provide epoxy grout installation training by the qualified epoxy grout manufacturer's representative for Contractor's workers that will be installing epoxy grout for equipment mounts. Schedule training to allow Construction Manager's attendance.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

2. Include training in:
 - a. Performance testing such as compressive strength testing of the epoxy grout.
 - b. All aspects of using the products, from mixing to application.
3. Transport test cubes to independent test laboratory and obtain test reports.
4. Training by manufacturer's representative does not relieve Contractor of overall responsibility for this portion of the Work.
5. Submit a list of attendees that have been satisfactorily trained to perform epoxy grout installation for equipment mounting.

3.05 SUPPLEMENT

- A. The supplement listed below, following "End of Section," is a part of this specification:
 1. 24-hour Evaluation of Nonshrink Grout Test Form and Grout Testing Procedures.

END OF SECTION

SUPPLEMENT 1

(Test Lab Name)

(Address)

(Phone No.)

24-HOUR EVALUATION OF NONSHRINK GROUT TEST FORM

OBJECTIVE: Define standard set of test procedures for an independent testing laboratory to perform and complete within a 24-hour period.

SCOPE: Utilize test procedures providing 24-hour results to duplicate field grouting demands. Intent of evaluation is to establish grout manufacturer's qualifications.

PRIOR TO TEST: Obtain three bags of each type of grout.

1. From intended grout supplier for Project.
2. Three bags of grout shall be of same lot number.

ANSWER THE FOLLOWING QUESTIONS FOR GROUT BEING TESTED FROM LITERATURE, DATA, AND PRINTING ON BAG:

- A. Product data and warranty information contained in company literature and data? Yes_____ No_____
- B. Literature and bag information meet specified requirements? Yes_____ No_____
- C. Manufacturer guarantees grout as specified in Article Guarantee? Yes_____ No_____
- D. Guarantee extends beyond grout replacement value and allows participation with Contractor in replacing and repairing defective areas? Yes_____ No_____
- E. Water demands and limits printed on bag? Yes_____ No_____
- F. Mixing information printed on the bag? Yes_____ No_____
- G. Temperature restrictions printed on bag? Yes_____ No_____

*Rejection of a grout will occur if one or more answers are noted NO.

GROUT TESTING PROCEDURES

A. Bagged Material:

1. List lot numbers. _____
2. List expiration date. _____
3. Weigh bags and record weight. _____

Owner’s Representative will disqualify grout if bag weights have misstated measure plus or minus 2 pounds by more than one out of three bags. (Accuracy of weights is required to regulate amount of water used in mixing since this will affect properties.)

B. Mixing and Consistency Determination:

1. Mix full bag of grout in 10-gallon pail.
2. Use electric drill with a paddle device to mix grout (jiffy or jiffler type paddle).
3. Use maximum water allowed per water requirements listed in bag instructions.
4. Mix grout to maximum time listed on bag instructions.
5. In accordance with ASTM C939 (flow cone) determine time of mixed grout through the flow cone. _____ seconds
6. Add water to attain 20- to 30-second flow in accordance with ASTM C939.
7. Record time of grout through cone at new water demand. _____ seconds
8. Record total water needed to attain 20- to 30-second flow. _____ pounds
9. Record percent of water. _____ percent

C. When fluid grout is specified and additional water is required beyond grout manufacturer’s listed maximum water, ASTM C1107/C1107M will be run at new water per grout ratio to determine whether grout passes using actual water requirements to be fluid. Use new water per grout ratio on remaining tests.

D. Bleed Test:

1. Fill two gallon cans half full of freshly mixed grout at ambient temperatures for each category and at required consistency for each.
2. Place one can of grout in tub of ice water and leave one can at ambient temperature.
3. Cover top of both cans with glass or plastic plate preventing evaporation.
4. Maintain 38 degrees F to 42 degrees F temperature with grout placed in ice and maintain ambient temperature for second container for 1 hour.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

5. Visually check for bleeding of water at 15-minute intervals for 2 hours.
6. Perform final observation at 24 hours.

If grout bleeds a small amount at temperatures specified, grout will be rejected.

E. Extended Flow Time and Segregation Test (for Category II and Category III):

1. Divide the remaining grout into two 3-gallon cans. Place the cans into the 40-degree F and 90-degree F containers and leave for 20, 40, and 60 minutes. Every 20 minutes remove and check for segregation or settlement of aggregate. Use a gloved hand to reach to the bottom of the can, if more than 1/4 inch of aggregate has settled to the bottom or aggregate has segregated into clumps reject the grout.
2. Right after the settlement test mix the grout with the drill mixer for 10 seconds. Take a ASTM C939 flow cone test of grout and record flow time. Maintain this process for 1 hour at ambient temperatures of 40 degrees F and 90 degrees F.
 - a. 20 min _____, sec. @ 40 degrees F.
 - b. 40 min _____, sec. @ 40 degrees F.
 - c. 60 min _____, sec. @ 40 degrees F.
 - d. 20 min _____, sec. @ 90 degrees F.
 - e. 40 min _____, sec. @ 90 degrees F.
 - f. 60 min _____, sec. @ 90 degrees F.

All Category II and Category III grout that will not go through the flow cone with continuous flow after 60 minutes will be disqualified.

_____	_____
Qualified	Disqualified

F. 24-hour Strength Test:

1. Using grout left in mixing cans in accordance with ASTM C1107/C1107M for mixing and consistency determination test and for extended time flow test, make minimum of nine cube samples.
2. Store cubes at 70 degrees F for 24 hours.
3. Record average compressive strength of nine cubes at 24 hours.

Grout will be disqualified if 24-hour compressive strengths are less than 2,500 psi for grouts claiming fluid placement capabilities.

Grouts that have not been disqualified after these tests are qualified for use on the Project for the application indicated in Nonshrink Grout Schedule.

Signature of Independent Testing Laboratory

Date Test Conducted

**SECTION 09 91 13
EXTERIOR PAINTING**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Primers.
 - 2. Finish coatings.

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include preparation requirements and application instructions.
 - 2. Indicate VOC content.
- B. Samples: For each type of topcoat product.
- C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
 - 1. Submit Samples on rigid backing, 8 inches square.
 - 2. Apply coats on Samples in steps to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- D. Product Schedule: Use same designations indicated on the Drawings and in Article Exterior Painting Schedule to cross-reference paint systems specified in this section. Include color designations.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

1.04 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Paint Products: 5 percent, but not less than 1 gallon of each material and color applied.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 degrees F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.06 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 degrees F.
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Lanco.
- B. Sherwin-Williams.
- C. PPG Industries.
- D. Source Limitations: Obtain each paint product from single source from single manufacturer.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

2.02 PAINT PRODUCTS, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by topcoat manufacturer for use in paint system and on substrate indicated.

B. Colors: Provide color wheel to tenant to select final colors. Colors are to generally match existing construction on site.

2.03 PRIMERS

A. Alkyd Metal Primer: Corrosion-resistant, solvent-based, alkyd primer formulated for use on prepared ferrous metals subject to industrial and light marine environments.

1. Lanco SG-664; Super Galvanized Rust Inhibitive Primer.
2. Sherwin Williams; Uniflex Rust Inhibitive Metal Primer.

2.04 FINISH COATINGS

A. Exterior Alkyd Enamel, Semigloss: Solvent-based, pigmented, alkyd enamel formulated for mold, microbial, and water resistance and for use on exterior, primed, wood and metal surfaces.

1. Lanco SE-800 ; Rust Eliminator Alkyd Gloss.
2. Sherwin Williams; Seaguard 1000 Modified Alkyd High-Gloss.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions, with applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify suitability of substrates, including surface conditions and compatibility, with finishes and primers.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

- C. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.02 PREPARATION

- A. Comply with manufacturer's written instructions applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems specified in this section.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

3.03 INSTALLATION

- A. Apply paints in accordance with manufacturer's written instructions.
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 4. Primers specified in Article Exterior Painting Schedule may be omitted on items that are factory primed or factory finished if compatible with intermediate and topcoat coatings and acceptable to intermediate and topcoat paint manufacturers.
- B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
1. Paint the following work where exposed to view from 15 feet outside the footprint of the structure:
 - a. Uninsulated metal piping.
 - b. Pipe hangers and supports.
 - c. Metal conduit.

3.04 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
1. Contractor shall touch up and restore painted surfaces damaged by testing.
 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written instructions, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written instructions.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3.05 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
 - 1. Do not clean equipment with free-draining water and prevent solvents, thinners, cleaners, and other contaminants from entering into waterways, sanitary and storm drain systems, and ground.
 - 2. Dispose of contaminants in accordance with requirements of authorities having jurisdiction.
 - 3. Allow empty paint cans to dry before disposal.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.06 EXTERIOR PAINTING SCHEDULE

- A. Concrete Substrates, Nontraffic Surfaces:
 - 1. Latex System:
 - a. Prime Coat: Exterior, alkali-resistant, water-based primer.
 - b. Topcoat: Exterior latex paint, flat.
- B. Steel and Iron Substrates:
 - 1. Alkyd System:
 - a. Prime Coat: Alkyd metal primer or Shop primer specified in section in which substrate is specified.
 - b. Topcoat: Exterior alkyd enamel, semigloss.

END OF SECTION

SECTION 13 34 19
METAL BUILDING SYSTEMS

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Architectural Manufacturers' Association (AAMA):
 - a. 101, Standard Specifications for Windows, Doors, and Unit Skylights.
 - b. 605, Voluntary Specification for High Performance Organic Coatings on Architectural Extrusions and Panels.
 - c. 606.1, Voluntary Guide Specifications and Inspection Methods for Integral Color Anodic Finishes for Architectural Aluminum.
 2. American Institute of Steel Construction (AISC):
 - a. 360, Specification for Structural Steel Buildings.
 - b. RCSC Specification for Structural Joints Using ASTM A325 or A490 Bolts.
 - c. Design Guide 3: Serviceability Design Considerations for Steel Buildings.
 3. American Iron and Steel Institute (AISI): Specification for the Design of Cold-Formed Steel Structural Members.
 4. American Welding Society (AWS): D1.1/D1.1M, Structural Welding Code - Steel.
 5. ASTM International (ASTM):
 - a. A36/A36M, Standard Specification for Carbon Structural Steel.
 - b. A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
 - c. A325, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
 - d. A490/A490M, Standard Specification for Structural Bolts, Alloy Steel, Heat-Treated, 150 ksi Minimum Tensile Strength.
 - e. A529/A529M, Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
 - f. A572/A572M, Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
 - g. A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - h. A792/A792M, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

- i. A992/A992M, Standard Specification for Steel for Structural Shapes.
 - j. C991, Standard Specification for Flexible Fibrous Glass Insulation for Metal Buildings.
 - k. E84, Standard Test Method for Surface Burning Characteristics of Building Materials.
 - l. E96/E96M, Standard Test Methods for Water Vapor Transmission of Materials.
 - m. E2190, Standard Specification for Insulating Glass Unit Performance and Evaluation.
 - n. E1514, Standard Specification for Structural Standing Seam Steel Roof Panel Systems.
 - o. F1554, Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
6. International Accreditation Service, Inc. (IAS): Quality Certification Program.
 7. International Code Council (ICC): Florida Building Code (FBC).
 8. Metal Building Manufacturer's Association (MBMA): Metal Building Systems Manual.
 9. UL: 580, Tests for Uplift Resistance of Roof Assemblies.

1.02 SYSTEM DESCRIPTION

- A. Complete building package using manufacturer's standard components.
- B. Primary Framing System: Clear span rigid frame. Lateral Support System in Longitudinal Direction: Portal frames.
- C. Include roof accessories.

1.03 DESIGN REQUIREMENTS

- A. Designer: Manufacturer's designer of the Metal Building Structure.
- B. Applicable Building Code: The 2023 Florida Building Code (FBC).
- C. Refer to design criteria on the Drawing General Structural Notes.
- D. Design Standards:
 1. AISC 360.
 2. AISC RCSC Specification for Structural Joints Using ASTM A325 or ASTM A490 Bolts.

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3. AISI Specification for the Design of Cold-Formed Steel Structural Members.
 4. AWS D1.1/D1.1M.
- E. Consider prying action of bolts for bolted moment-resistant connections in primary framing.

1.04 CONTRACTOR/METAL BUILDING MANUFACTURER COORDINATION

- A. Submit metal building shop drawings and obtain approval prior to forming foundation concrete or fabricating foundation reinforcing steel. Confirm size of concrete column pilasters for steel column baseplates and its associated anchor bolt template.
- B. Verify interface of building components with foundation and coordinate required foundation revisions with Engineer of Record.

1.05 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
 - a. Manufacturer's literature and technical data.
 - b. Drawings Stamped by Designer:
 - 1) Drawings shall be specifically prepared for this Project.
 - 2) Mark out details that do not apply to Project.
 - 3) Show design load criteria, material specifications for framing members and connections, roof framing plan with dimensions and member sizes, baseplate details showing anchor bolt size and bolt layout, elevations of wall framing and bracing, instructions for temporary bracing, framing around roof and wall openings, details for joining and sealing of roof panels and wall cladding, and sections and details for all components and accessories.
 - c. Anchorage and bracing drawings.
 - d. Painting System: Specifications; include paint manufacturer's name, product trade name, and preparation for shop and field coats.
2. Samples: Minimum 2-inch by 3-inch metal for components requiring color selection.

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B. Informational Submittals:

1. Structural Calculations Stamped by Designer:
 - a. Complete analysis and design of structural components and connections in accordance with design requirements indicated.
 - b. Summary of building column reactions to foundation level for load cases.
 - c. Mark out calculations that do not apply to Project.
2. Anchorage and bracing calculations. Submit with Action Submittal for the same item.
3. Manufacturer's written instructions for shipping, handling, storage, protection, and erection or installation of building and components.
4. Manufacturer: IAS Quality Certification: IAS certificate showing name and address of manufacturer, effective date, and category of certification.
5. Erector:
 - a. IAS Quality Certification: IAS certificate showing name and address of erector, effective date, and category of certification, or, in lieu of IAS certification, documentation of past 5 years' experience record to include project name, location, date of completion, building manufacturer, and name and phone number of Owner's contact person.
 - b. Certification of approval by manufacturer.
6. Manufacturer's Certificate of Proper Installation.

1.06 QUALITY ASSURANCE

A. Qualifications:

1. Designer: Registered professional engineer valid in same state as Project.
2. Manufacturer: IAS Quality Certification: Metal Building Systems (MB).
3. Erector:
 - a. IAS Quality Certification as Certified Steel Erector (CSE), or 5 years of experience in erection of metal building systems in lieu of IAS certification.
 - b. Approval by manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect building components and accessories from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Deliver to Site with parts individually tagged.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

- C. Store on wood blocking or pallets, flat and off ground, to keep clean and to prevent damage or permanent distortion. Support bundles so there is no danger of tipping, sliding, rolling, shifting, or material damage. Cover with tarpaulins or other suitable weathertight ventilated covering.
- D. Protect finish of metal panels by application of removable plastic film or other suitable material placed between panels. Do not allow panels to come in contact with other material that would result in scratching, denting, staining or other damage to panel finish.

1.08 SPECIAL GUARANTEE

- A. Furnish manufacturer's extended guarantee or warranty, with Tenant named as beneficiary, in writing, as special guarantee. Special guarantee shall provide for correction, or at the option of Tenant, removal and replacement of Work specified in this Specification section found defective during a minimum period of 5 years and as stated below after date of Substantial Completion. Duties and obligations for correction or removal and replacement of defective Work as specified in the General Conditions.
- B. Conditions:
 - 1. Finish on metal roof, wall panels, flashing, and trim will not chalk, crack, check, blister, peel, flake, chip, or lose adhesion for 5 years.
 - 2. Roofing will remain weathertight for 20 years.

PART 2 PRODUCTS

2.01 BUILDING SYSTEM MANUFACTURERS

- A. Products manufactured or supplied by the following, and meeting these Specifications, may be used on this Project:
 - 1. American Buildings Company, Columbus, GA.
 - 2. Behlen Manufacturing Co., Columbus, NE.
 - 3. Bigbee Steel Buildings, Inc., Muscle Shoals, AL.
 - 4. Butler Manufacturing Co., Kansas City, MO.
 - 5. CBC Steel Buildings, Lathrop, CA.
 - 6. Ceco Corp., Columbus, MS.
 - 7. Chief Industries, Inc., Rensselaer, IN.
 - 8. Garco Building Systems, Airway Heights, WA.
 - 9. Inland Buildings, Cullman, AL.
 - 10. Kirby Building Systems, Inc., Columbus, GA.
 - 11. NCI Building Systems, Inc., Houston, TX.
 - 12. Nucor Building Systems, Waterloo, IN.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

13. Ruffin Building Systems, Oak Grove, LA.
14. Star Building Systems, a Robertson Ceco Co., Oklahoma City, OK.
15. United Structures of America, Inc., Houston, TX.
16. Varco-Pruden Buildings, Memphis, TN.
17. Whirlwind Building Systems, Houston, TX.

2.02 COMPONENTS

A. Structural Framing and Bracing:

1. Primary Framing: ASTM A36/A36M, ASTM A529/A529M, ASTM A572/A572M, or ASTM A992 with 3/16-inch minimum thickness hot-dipped galvanizing and factory primer compatible with galvanizing and finish coating.
2. Secondary Framing: Steel for cold-formed galvanized channel and z-sections shall be ASTM A653/A653M, Structural Steel (SS) Grade 33 or High-Strength Low-Alloy Steel (HSLAS) Grade 50 Type A or B, with G60 galvanized coating and minimum design thickness equal to 0.0346 inch.
3. Bracing:
 - a. ASTM A36/A36M or ASTM F1554, Grade 36, for threaded rod, or ASTM A36/A36M for rolled shapes.
 - b. Do not use wire rope or cable for permanent bracing.
4. Bolted Connections:
 - a. Primary Framing: ASTM A325 or ASTM A490/A490M high-strength bolted connections.
 - b. Secondary Framing: ASTM A307 or ASTM A325.

B. Roof and Wall Panels:

1. Material:
 - a. ASTM A653/A653M or ASTM A792/A792M preformed ribbed steel panels, Grade 50, minimum.
 - b. Minimum 24-gauge galvanized steel with roll-formed corrugations for structural stiffness and appearance.
 - c. Finish: Factory-applied baked enamel, in color selected by Owner.
2. Roof Panel System:
 - a. ASTM E1514 structural standing seam steel roof panel system.
 - b. Panels: One piece from eave to ridge, with concealed clips and fasteners to purlins to allow for thermal movement over 120-degree ambient temperature range.
 - c. Sidelap Joints: Fabricate with a factory caulked, mechanically seamed cleat.
 - d. Tested and certified to meet UL 580, Class 90 wind uplift rating.

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3. Wall Panel System:
 - a. One piece from eave to sill, with base trim at sill.
 - b. Sidelaps: Overlapping major ribs with exposed color-matched fasteners.

2.03 ACCESSORIES

- A. Trim: Factory-formed and factory-painted ridge cap, rake trim, simple eave trim, panel side trim, corner trim, door trim, and other trim as necessary.
- B. Gutter Fascia and Downspouts:
 1. Material: ASTM A653/A653M, 24-gauge galvanized steel.
 2. Gutter Fascia:
 - a. Prefinish.
 - b. Furnish hangers with factory-applied paint.
 3. Preformed Corner Closures: Furnish to match configuration of gable fascia.
 4. Downspouts:
 - a. Configuration: Nominal 6-inch corrugated rectangular box with minimum 33 square inches of cross section area.
 - b. Factory finish to match wall panels.
 - c. Align downspouts with frame locations, direct runoff as appropriate towards drain inlets.
- C. Miscellaneous: Furnish fasteners, metal-backed neoprene washers, weatherstripping, sealants, roof jacks, roof curbs, gaskets, and other items as required for a complete installation.

2.04 FABRICATION

- A. Factory Fabricate: To manufacturer's written standards, MBMA Metal Building Systems Manual, and AISC Specification for Structural Steel Buildings.
- B. Building Parts: Accurate and true to dimension to facilitate building erection without cutting, fitting, or other alterations.
- C. Welded Connections: In accordance with AWS D1.1/D1.1M.
- D. Shop Primer for Primary Framing: Clean and apply one coat of manufacturer's primer compatible with galvanizing in accordance with MBMA Metal Building Systems Manual.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine supporting concrete foundation and anchor bolt placement for compliance with requirements for installation tolerances and other conditions affecting performance of metal building.

3.02 BUILDING ERECTION

- A. Erect building system in accordance with manufacturer's standards and instructions.
- B. Provide temporary bracing in accordance with MBMA standards and as required for safe installation.
- C. Structural Framing:
 - 1. Do not field cut or alter primary or secondary framing members.
 - 2. Installation and Tolerances: In accordance with MBMA Metal Building Systems Manual.
- D. Roof and Wall Panels:
 - 1. Field cutting of panels by torch is not permitted.
 - 2. Attach panels to structural supports to maintain a weathertight seal while allowing for thermal and structural movement.
 - a. Install exposed fasteners in true vertical and horizontal alignment.
 - b. Field seam side laps of standing seam roof panels using electrically operated seaming machine.
 - c. Use proper tools to install screw fasteners to compress neoprene washer without damaging washer or stripping metal.
 - 3. Install manufacturer's standard joint sealants, gaskets, and closure strips as required for weathertight installation.
 - 4. Install roof curbs for roof top equipment.
 - 5. Field Cutting and Patching: Perform in manner not to impair appearance, weathertightness, or structural capacity of panel system.

3.03 REPAIR, CLEANING, AND PAINTING

- A. Immediately following erection, remove unused material, screws, fasteners, and other debris from completed installation. Use caution in removing metal cuttings from surface of prefinished metal panels.
- B. Replace damaged, dented, buckled, or discolored metal panels.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

C. Repair damaged painted and galvanized surfaces as specified in Section 09 91 13, Exterior Painting.

D. Finish Painting: As specified in Section 09 91 13, Exterior Painting.

3.04 FIELD QUALITY CONTROL

A. Special inspection will be provided by Construction Manager where indicated on the Drawings.

3.05 MANUFACTURER'S SERVICES

A. Provide manufacturer's representative at Site for installation assistance, inspection, and certification of proper installation.

END OF SECTION

SECTION 26 05 01
ELECTRICAL

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Association of State Highway Transportation Officials (AASHTO).
 2. ASTM International (ASTM):
 - a. A167, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - b. A240/A240M, Standard Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels.
 - c. A1011/A1011M, Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
 - d. C857, Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.
 3. Federal Specifications (FS):
 - a. W-C-596, Connector, Electrical, Power, General Specification for.
 - b. W-S-896, Switch, Toggle (Toggle and Lock), Flush Mounted (General Specification).
 4. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
 - a. C62.41, Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits.
 - b. 81, Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System.
 5. International Electrical Testing Association (NETA): ATS, Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
 6. National Electrical Contractor's Association, Inc. (NECA): 1, Standard Practices for Good Workmanship in Electrical Contracting.
 7. National Electrical Manufacturers Association (NEMA):
 - a. C80.1, Rigid Steel Conduit-Zinc Coated.
 - b. 250, Enclosures for Electrical Equipment (1,000 Volts Maximum).
 - c. KS 1 Heavy Duty Enclosed and Dead-Ront Switches (600 Volts Maximum)
 - d. PB 1, Panelboards.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

- e. RN 1, Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
- f. ST 20, Dry Type Transformers for General Applications.
- g. TC 2, Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.
- h. TC 3, PVC Fittings for Use with Rigid PVC Conduit and Tubing.
- i. WC 70, Standard for Non-Shielded Power Cables Rated 2000 V or Less for the Distribution of Electrical Energy.
- j. WD 1, General Color Requirements for Wiring Devices.
- 8. National Fire Protection Association (NFPA): 70, National Electrical Code (NEC).
- 9. UL:
 - a. 6, Electrical Rigid Metal Conduit—Steel.
 - b. 62, Flexible Cord and Fixture Wire.
 - c. 67, Panelboards.
 - d. 360, Liquid-Tight Flexible Steel Conduit.
 - e. 486C, Splicing Wire Connectors.
 - f. 489, Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit Breaker Enclosures.
 - g. 508, Industrial Control Equipment.
 - h. 510, Polyvinyl Chloride, Polyethylene and Rubber Insulating Tape.
 - i. 514B, Fittings for Cable and Conduit.
 - j. 651, Schedule 40 and 80 PVC Conduit.
 - k. 943, Ground-Fault Circuit Interrupters.
 - l. 1449, Transient Voltage Surge Suppressors.
 - m. 1561 Dry-Type General Purpose and Power Transformers.

1.02 DEFINITIONS

- A. AHJ: Authority Having Jurisdiction.
- B. MCOV: Maximum Allowable Continuous Operating Voltage.
- C. MOV: Metal Oxide Varistor.
- D. SASD: Silicon Avalanche Suppressor Diode.
- E. SVR: Surge Voltage Rating.
- F. TVSS: Transient Voltage Surge Suppressor.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

1.03 SUBMITTALS

- A. Action Submittals:
 - 1. Boxes and device plates.
 - 2. Junction and pull boxes.
 - 3. Precast handholes.
 - 4. Wiring devices.
 - 5. Panelboards.
 - 6. Disconnect switches.
 - 7. Support and framing channels.
 - 8. Dry type transformer.
 - 9. Nameplates and nameplate schedule.
 - 10. TVSS equipment.
 - 11. Conduit, fittings, and accessories.
 - 12. Conductors, cable, and accessories.
 - 13. Grounding materials.

1.04 APPROVAL BY AUTHORITY HAVING JURISDICTION

- A. Provide the Work in accordance with NFPA 70, National Electrical Code (NEC). Where required by the Authority Having Jurisdiction (AHJ), material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ, in order to provide a basis for approval under the NEC.
- B. Materials and equipment manufactured within the scope of standards published by UL, shall conform to those standards and shall have an applied UL listing mark or label.

PART 2 PRODUCTS

2.01 GENERAL

- A. Products shall comply with all applicable provisions of NFPA 70.
- B. Like Items of Equipment: End products of one manufacturer in order to achieve standardization for appearance, operation, maintenance, spare parts, and manufacturer's service.
- C. Equipment and Devices Installed Outdoors or in Unheated Enclosures: Capable of continuous operation within ambient temperature range of 0 degree F to 130 degrees F.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

D. Equipment Finish:

1. Manufacturer's standard finish color, except where specific color is indicated.
2. If manufacturer has no standard color, finish equipment in accordance with light gray color finish as approved by Tenant.

2.02 OUTLET AND DEVICE BOXES

A. Cast Metal:

1. Box: Cast ferrous metal.
2. Cover: Gasketed, weatherproof, and cast ferrous metal with stainless steel screws.
3. Hubs: Threaded.
4. Lugs: Cast mounting.

2.03 JUNCTION AND PULL BOXES

A. Outlet Boxes Used as Junction or Pull Box: As specified under Article Outlet and Device Boxes.

B. Conduit Bodies Used as Junction Boxes: As specified under Article Conduit and Fittings.

C. Large Stainless Steel Box:

1. NEMA 250, Type 4X.
2. Box: 14-gauge, ASTM A240, Type 316 stainless steel with white enamel painted interior mounting panel.
3. Cover: Hinged.
4. Hardware and Machine Screws: ASTM A167, Type 316 stainless steel.

2.04 PRECAST HANDHOLES

A. Construction: Precast concrete.

B. Loading: AASHTO HS-20, as noted below, in accordance with ASTM C857.

C. Drainage:

1. Slope floors toward drain points leaving no pockets or other nondraining areas.
2. Provide drainage outlet at low point of floor.

D. Raceway Entrances: Provide knockout panels on all four sides.

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- E. Handhole Frames and Covers:
 - 1. Material: Steel, hot-dipped galvanized.
 - 2. Cover Type: Solid, bolt-on or hinged, of checkered design, as noted below.
 - 3. Cover Loading: As noted below.
 - 4. Cover Designation: Lettering minimum 2 inches in height, as shown.

F. Hardware: Steel, hot-dip galvanized.

G. Furnish knockout for ground rod in each handhole.

2.05 WIRING DEVICES

A. Switches:

- 1. NEMA WD 1 and FS W-S-896.
- 2. Industrial grade, totally enclosed, ac type, with quiet tumbler switches and screw terminals.
- 3. Capable of controlling 100 percent tungsten filament and fluorescent lamp loads.
- 4. Rating: 20 amps, 120/277 volts.
- 5. Color: Gray.
- 6. Automatic grounding clip and integral grounding terminal on mounting strap.

B. Receptacle, Single and Duplex:

- 1. NEMA WD 1 and FS W-C-596.
- 2. Specification grade, two-pole, three-wire grounding type with screw type wire terminals suitable for No. 10 AWG.
- 3. High strength, thermoplastic base color.
- 4. Color: Ivory.
- 5. Contact Arrangement: Contact to be made on two sides of each inserted blade without detent.
- 6. Rating: 125 volts, NEMA WD 1, Configuration 5-20R, 20 amps.
- 7. One-piece mounting strap with integral ground contact (rivetless construction).

C. Receptacle, Quadplex: Shall consist of two duplex receptacles in one box.

D. Receptacle, Ground Fault Circuit Interrupter:

- 1. Duplex, listed Class A to UL Standard 943, tripping at 5 mA.
- 2. Color: Ivory.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

3. Rating: 125 volts, NEMA WD 1, Configuration 5-20R, 20 amps.
4. Size: For 2-inch by 4-inch outlet boxes.
5. Standard Model: NEMA WD 1, with screw terminals and provisions for testing.
6. Feed-Through Model: NEMA WD 1, with feed-through screw terminals and provisions for testing.
7. Impact resistant nylon face.

2.06 DEVICE PLATES

- A. General: Sectional type plates not permitted.
- B. Plastic:
 1. Material: Specification grade, 0.10-inch minimum thickness, noncombustible, thermosetting.
 2. Color: To match associated wiring device.
 3. Mounting Screw: Oval-head metal, color matched to plate.
- C. Cast Metal:
 1. Material: Copper-free aluminum, with gaskets.
 2. Screw: Oval-head stainless steel.
- D. Engraved:
 1. Character Height: 1/8 inch.
 2. Filler: Black.
- E. Weatherproof:
 1. For Receptacles, Wet Locations:
 - a. Impact-resistant, nonmetallic, single-gang, horizontal-mounting, providing, while in-use, NEMA 3R rating.
 - b. Stainless steel mounting and hinge hardware.
 - c. Lockable, paintable.
 - d. Color: Gray.
 2. For Switches:
 - a. Gasketed, cast-metal or cast-aluminum, incorporating external operator for internal switch.
 - b. Mounting Screw: Stainless steel.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

2.07 LIGHTING AND POWER DISTRIBUTION PANELBOARD

- A. NEMA PB 1, NFPA 70, and UL 67.
- B. Panelboards and Circuit Breakers: Suitable for use with 75 degrees C wire at full NFPA 70, 75 degrees C ampacity.
- C. Short-Circuit Current Equipment Rating: Fully rated; series connected unacceptable.
- D. Rating: As indicated on the Drawings.
- E. Cabinet:
 - 1. NEMA 250, Type 4X stainless steel.
 - 2. Material: Code-gauge, Type 304 stainless steel with reinforced steel frame.
 - 3. Wiring Gutter: Minimum 4-inch square; both sides, top and bottom.
 - 4. Front: Fastened with adjustable clamps.
 - a. Trim Size: As required by mounting.
 - b. Finish: Manufacturer's standard.
 - 5. Interior:
 - a. Factory assembled; complete with circuit breakers.
 - b. Spaces: Cover openings with easily removable metal cover.
 - 6. Door Hinges: Concealed.
 - 7. Locking Device:
 - a. Flush type.
 - b. Doors Over 30 Inches in Height: Multipoint.
 - c. Identical keylocks, with two milled keys each lock.
 - 8. Circuit Directory: Metal frame with transparent plastic face and enclosed card on interior of door.
- F. Bus Bar:
 - 1. Material: Copper full sized throughout length.
 - 2. Neutral: Insulated, rated same as phase bus bars with at least one terminal screw for each branch circuit.
 - 3. Ground: Copper, installed on panelboard frame, bonded to box with at least one terminal screw for each circuit.
 - 4. Lugs and Connection Points:
 - a. Suitable for either copper or aluminum conductors.
 - b. Solderless main lugs for main, neutral, and ground bus bars.
 - c. Subfeed or through-feed lugs as shown.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

G. Circuit Breakers:

1. UL 489.
2. Thermal-magnetic, quick-make, quick-break, molded case, of indicating type showing ON/OFF and TRIPPED positions of operating handle.
3. Type: Bolt-on circuit breakers in all panelboards.
4. Multipole circuit breakers designed to automatically open all poles when an overload occurs on one pole.
5. Do not use tandem or dual circuit breakers in normal single-pole spaces.
6. Ground Fault Circuit Interrupter (GFCI): UL Class A GFCI, 5 mA trip, and 22,000 amps interrupting capacity circuit breakers.
7. Ground Fault Equipment Protector (GFEP): 30 mA trip, 10,000 amps interrupting capacity circuit breaker, and UL listed for equipment ground fault protection.

2.08 NONFUSED SWITCH, INDIVIDUAL, 0 VOLT TO 600 VOLTS

- A. NEMA KS 1.
- B. Quick-make, quick-break, motor rated, load-break, heavy-duty (HD) type with external markings clearly indicating ON/OFF positions.
- C. Suitable for use with 75 degrees C wire at full NFPA 70, 75 degrees C ampacity.
- D. Enclosure: As specified under Execution.
- E. Interlock: Enclosure and switch to prevent opening cover with switch in the ON position.

2.09 DRY TYPE POWER TRANSFORMERS (0-VOLT TO 600-VOLT PRIMARY)

- A. Type: Self-cooled, two-winding.
- B. UL 1561 and NEMA ST 20.
- C. Insulation Class, Temperature Rise, and Impedance: Manufacturer's standard.
- D. Core and Coil:
 1. 30 kVA or Less: Encapsulated.
- E. Enclosure:
 1. 30 kVA or Less: NEMA 250, Type 3R, nonventilated.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

- F. Voltage Taps: Full capacity, 2-1/2 percent, two above and two below normal voltage rating.
- G. Sound Level: Not to exceed NEMA ST 20 levels.
- H. Vibration isolators to minimize and isolate sound transmission.

2.10 SUPPORT AND FRAMING CHANNELS

- A. Stainless Steel Framing Channel: Rolled, ASTM A167, Type 316 stainless steel, 12 gauge.

2.11 NAMEPLATES

- A. Material: Laminated plastic.
- B. Attachment: Adhesive.
- C. Color: Black, engraved to a white core, or as shown.
- D. Engraving:
 - 1. Devices and Equipment: Name or tag shown, or as required.
 - 2. Panelboards:
 - a. Designation.
 - b. Service voltage.
 - c. Phases.
 - 3. Minimum Requirement: Label metering and power distribution equipment, local control panels, junction boxes, motor controls, and transformers.
- E. Letter Height:
 - 1. Equipment and Panelboards: 1/4 inch.

2.12 TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS) EQUIPMENT

- A. General:
 - 1. Units shall be suitable for the service voltage and configuration (phases and wires) shown.
 - 2. Protection Modes:
 - a. Normal, differential, and common.
 - b. Bipolar or bi-directional.
 - 3. Ratings: Short-circuit current rating shall equal or exceed that of protected distribution equipment. Surge Voltage Rating (SVR) shall not

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

exceed those specified under UL 1449 for the associated nominal system voltage. Maximum Allowable Continuous Operating Voltage (MCOV) shall be at least 115 percent of the nominal system voltage.

4. Unit shall be UL-listed.
5. Provide status indicators for unit ON-LINE and unit operation NORMAL.
6. Provide common alarm contact output.
7. Provide fusible disconnect switch (integral with TVSS unit, where available) where not shown connected via branch circuit device of protected distribution equipment.
8. Minimum Enclosure Rating: Provide Type 4/4X.

B. Type 2 TVSS:

1. Requirements: Designed for critical loads at service equipment (Category C3/B3) or distribution panelboard (Category C2/B3) locations. Unit shall utilize voltage-matched Silicon Avalanche Suppressor Diode (SASD) technology. Unit shall utilize modular, plug-in suppressor design.

2.13 CONDUIT AND FITTINGS

A. Rigid Galvanized Steel Conduit (RGS):

1. Meet requirements of NEMA C80.1 and UL 6.
2. Material: Hot-dip galvanized, with chromated protective layer.

B. PVC Schedule 40 Conduit:

1. Meet requirements of NEMA TC 2 and UL 651.
2. UL listed for concrete encasement, underground direct burial, concealed, or direct sunlight exposure, and 90 degrees C insulated conductors.

C. PVC Coated Rigid Galvanized Steel Conduit:

1. Meet requirements of NEMA RN 1.
2. Material:
 - a. Meet requirements of NEMA C80.1 and UL 6.
 - b. Exterior Finish: PVC coating, 40 mils nominal thickness, bond to metal shall have tensile strength greater than PVC.
 - c. Interior Finish: Urethane coating 2 mils nominal thickness.
3. Threads: Hot dipped galvanized and factory coated with urethane.
4. Bendable without damage to either interior or exterior coating.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

D. Flexible Metal, Liquid-Tight Conduit:

1. UL 360 listed for 105 degrees C insulated conductors.
2. Material: Galvanized steel, with an extruded PVC jacket.

E. Fittings:

1. Provide bushings, grounding bushings, conduit hubs, conduit bodies, couplings, unions, conduit sealing fittings, drain seals, drain/breather fittings, expansion fittings, and cable sealing fittings, as applicable.
2. Rigid Galvanized Steel:
 - a. Meet requirements of UL 514B.
 - b. Type: Threaded, galvanized.
3. PVC Conduit:
 - a. Meet requirements of NEMA TC 3.
 - b. Type: PVC, slip-on.
4. PVC Coated Rigid Galvanized Steel Conduit:
 - a. Meet requirements of UL 514.
 - b. Fittings: Rigid galvanized steel type, PVC coated by conduit manufacturer.
 - c. Conduit Bodies: Cast metal hot dipped galvanized or urethane finish. Cover shall be of same material as conduit body. PVC coated by conduit manufacturer.
 - d. Finish: 40 mil PVC exterior, 2 mil urethane interior.
 - e. Overlapping pressure sealing sleeves.
5. Flexible Metal, Liquid-Tight Conduit:
 - a. Metal insulated throat connectors with integral nylon or plastic bushing rated for 105 degrees C.
 - b. Insulated throat and sealing O-rings.

2.14 CONDUIT ACCESSORIES

A. Duct Bank Spacers:

1. Type: Nonmetallic, interlocking, for multiple conduit sizes.
2. Suitable for all types of conduit.

B. Identification Devices:

1. Raceway Tags:
 - a. Material: Permanent, polyethylene.
 - b. Shape: Round.
 - c. Raceway Designation: Pressure stamped, embossed, or engraved.
 - d. Tags relying on adhesives or taped-on markers not permitted.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

2. Warning Tape:
 - a. Material: Polyethylene, 4-mil gauge with detectable strip.
 - b. Color: Red.
 - c. Width: Minimum 3 inches.
 - d. Designation: Warning on tape that electric circuit is located below tape.
 - e. Identifying Letters: Minimum 1-inch high permanent black lettering imprinted continuously over entire length.

C. Raceway Band:

1. Slip-on Type:
 - a. Provide heat-shrinkable, black, medium-wall polyolefin tubing with factory-applied adhesive/sealant. Select product size based upon raceway outside diameter.
 - b. Manufacturer and Product: 3M; Type IMCSN, medium wall cable sleeve.
2. Wrap-around Type:
 - a. Provide 4-inch width, 20-mil thickness, nonprinted black PVC corrosion protection tape with primer.
 - b. Manufacturer and Product: 3M; Type Scotchrap 51 with Scotchrap Pipe Primer.

2.15 CONDUCTORS AND CABLES

A. Conductors 600 Volts and Below:

1. Conform to applicable requirements of NEMA WC 71.
2. Conductor Type:
 - a. 120-Volt and 277-Volt Lighting, No. 10 AWG and Smaller: Solid copper.
 - b. 120-Volt Receptacle Circuits, No. 10 AWG and Smaller: Solid copper.
 - c. All Other Circuits: Stranded copper.
3. Insulation: Type THHN/THWN.
4. Flexible Cords and Cables:
 - a. Type SOW-A/50 with ethylene propylene rubber insulation in accordance with UL 62.
 - b. Conform to physical and minimum thickness requirements of NEMA WC 71.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

B. Accessories:

1. Tape:
 - a. General Purpose, Flame Retardant: 7 mils, vinyl plastic, Scotch Brand 33, rated for 90 degrees C minimum, meeting requirements of UL 510.
 - b. Flame Retardant, Cold and Weather Resistant: 8.5 mils, vinyl plastic, Scotch Brand 88.
 - c. Arc and Fireproofing:
 - 1) 30 mils, elastomer.
 - 2) Manufacturers and Products:
 - a) 3M; Scotch Brand 77, with Scotch Brand 69 glass cloth tapebinder.
 - b) Plymount; Plyarc 53, with Plyglas 77 glass cloth tapebinder.
2. Identification Devices:
 - a. Sleeve-type, permanent, PVC, yellow or white, with legible machine-printed black markings.
 - b. Manufacturer and Products: Raychem; Type D-SCE or ZH-SCE.
3. Connectors and Terminations:
 - a. Nylon, Self-Insulated Crimp Connectors:
 - 1) Manufacturers and Products:
 - a) Thomas & Betts; Sta-Kon.
 - b) Burndy; Insulug.
 - c) ILSCO.
4. Self-Insulated, Freespring Wire Connector (Wire Nuts):
 - a. Plated steel, square wire springs.
 - b. UL Standard 486C.
 - c. Manufacturers and Products:
 - 1) Thomas & Betts.
 - 2) Ideal; Twister.
5. Cable Lugs:
 - a. Rated 600 volts of same material as conductor metal.
 - b. Uninsulated Crimp Connectors and Terminators:
 - 1) Suitable for use with 75 degrees C wire at full NFPA 70, 75 degrees C ampacity.
 - 2) Manufacturers and Products:
 - a) Thomas & Betts; Color-Keyed.
 - b) Burndy; Hydent.
 - c) ILSCO.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- c. Uninsulated, Bolted, Two-Way Connectors and Terminators:
 - 1) Manufacturers and Products:
 - a) Thomas & Betts; Locktite.
 - b) Burndy; Quiklug.
 - c) ILSCO.
- 6. Cable Ties:
 - a. Nylon, adjustable, self-locking, and reusable.
 - b. Manufacturer and Product: Thomas & Betts; TY-RAP.
- 7. Heat Shrinkable Insulation:
 - a. Thermally stabilized, crosslinked polyolefin.
 - b. Manufacturer and Product: Thomas & Betts; SHRINK-KON.

2.16 GROUNDING

- A. Ground Rods: Provide copper-clad steel with minimum diameter of 3/4 inch, and length of 10 feet.
- B. Ground Conductors: As specified in Article Conductors and Cables.
- C. Connectors:
 - 1. Exothermic Weld Type:
 - a. Outdoor Weld: Suitable for exposure to elements or direct burial.
 - b. Indoor Weld: Use low-smoke, low-emission process.
 - c. Manufacturers:
 - 1) Erico Products, Inc.; Cadweld and Cadweld Exolon.
 - 2) Thermoweld.

PART 3 EXECUTION

3.01 GENERAL

- A. Install materials and equipment in accordance with manufacturer's instructions and recommendations.
- B. Work shall comply with all applicable provisions of NECA 1.
- C. Install materials and equipment in hazardous areas in a manner acceptable to regulatory authority having jurisdiction for the class, division, and group of hazardous areas shown.
- D. Electrical Drawings show general locations of equipment, devices, and raceway, unless specifically dimensioned.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3.02 PROTECTION FOLLOWING INSTALLATION

- A. Protect materials and equipment from corrosion, physical damage, and effects of moisture on insulation.
- B. Cap conduit runs during construction with manufactured seals.
- C. Close openings in boxes or equipment during construction.

3.03 OUTLET AND DEVICE BOXES

- A. Install suitable for conditions encountered at each outlet or device in wiring or raceway system, sized to meet NFPA 70 requirements.
- B. Size:
 - 1. Depth: Minimum 2 inches, unless otherwise required by structural conditions. Box extensions not permitted.
 - 2. Switch and Receptacle: Minimum 2-inch by 4-inch sheet steel device box.
- C. Locations:
 - 1. Drawing locations are approximate.
 - 2. To avoid interference with mechanical equipment or structural features, relocate outlets as directed by Construction Manager.
- D. Mounting Height:
 - 1. General:
 - a. Dimensions given to centerline of box.
 - b. Where specified heights do not suit building construction or finish, mount as directed by Construction Manager.
 - 2. Switches: 48 inches above floor.
 - 3. Receptacles:
 - a. Outdoor, All Areas: 48 inches above finished grade.
- E. Install plumb and level.
- F. Support boxes independently of conduit by attachment to building structure or structural member.
- G. Box Type (Steel Raceway System):
 - 1. Outdoor Locations: Cast metal.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3.04 JUNCTION AND PULL BOXES

- A. Install where shown and where necessary to terminate, tap-off, or redirect multiple conduit runs.
- B. Install pull boxes where necessary in raceway system to facilitate conductor installation.
- C. Install in conduit runs at least every 150 feet or after the equivalent of three right-angle bends.
- D. Use outlet boxes as junction and pull boxes wherever possible and allowed by applicable codes.
- E. Use conduit bodies as junction and pull boxes where no splices are required and their use is allowed by applicable codes.
- F. Installed boxes shall be accessible.
- G. Do not install on finished surfaces.
- H. Install plumb and level.
- I. Support boxes independently of conduit by attachment to building structure or structural member.
- J. At or Belowgrade:
 - 1. Install boxes for belowgrade conduit flush with finished grade in locations outside of paved areas, roadways, or walkways.
 - 2. If adjacent structure is available, box may be mounted on structure surface just above finished grade in accessible but unobtrusive location.
 - 3. Obtain Tenant's written acceptance prior to installation in paved areas, roadways, or walkways.
 - 4. Use boxes and covers suitable to support anticipated weights.
- K. Mounting Hardware:
 - 1. Outdoor or Noncorrosive Indoor Wet Areas: Stainless steel.
- L. Location/Type:
 - 1. Outdoor, Where Indicated Weatherproof (WP): NEMA 250, Type 4X stainless steel.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3.05 PRECAST HANDHOLES AND MANHOLES

- A. Excavate, shore, brace, backfill, and final grade in accordance with Section 31 23 16, Excavation, and Section 31 23 23.15, Trench Backfill.
- B. Do not install until final raceway grading has been determined.
- C. Install such that raceways enter at nearly right angles and as near as possible to one end of wall, unless otherwise shown.
- D. Install handhole or manholes so there is no more than 350 feet between boxes on a conduit run or when total number of bends on a conduit run exceed 270 degrees.

3.06 WIRING DEVICES

- A. Switches:
 - 1. Mounting Height: See Article Outlet and Device Boxes.
 - 2. Install with switch operation in vertical position.
 - 3. Install single-pole, two-way switches such that toggle is in up position when switch is on.
- B. Receptacles:
 - 1. Install with grounding slot up, except where horizontal mounting is shown, in which case install with neutral slot up.
 - 2. Weatherproof Receptacles:
 - a. Install in cast metal box.
 - b. Install such that hinge for protective cover is above receptacle opening.
 - 3. Ground Fault Interrupter: Install feed-through model at locations where ground fault protection is specified for “downstream” conventional receptacles.

3.07 DEVICE PLATES

- A. Securely fasten to wiring device; ensure a tight fit to box.
- B. Surface Mounted: Plate shall not extend beyond sides of box, unless plates have no sharp corners or edges.
- C. Install with alignment tolerance to box of 1/16 inch.
- D. Engrave with designated titles.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

E. Types (Unless Otherwise Shown):

1. Outdoor: Weatherproof.

3.08 PANELBOARDS

A. Install securely, plumb, in-line and square with walls.

B. Install top of cabinet 6 feet above floor, unless otherwise shown.

C. Provide typewritten circuit directory for each panelboard.

D. Cabinet Location/Type:

1. Wet or Outdoor: NEMA 250, Type 4X stainless steel.

3.09 DRY TYPE POWER TRANSFORMERS (0-VOLT TO 600-VOLT PRIMARY)

A. Load external vibration isolator such that no direct transformer unit metal is in direct contact with mounting surface.

B. Provide moisture-proof flexible conduit for electrical connections.

C. Connect voltage taps to achieve (approximately) rated output voltage under normal plant load conditions.

D. Provide wall brackets where required.

3.10 SUPPORT AND FRAMING CHANNELS

A. Install where required for mounting and supporting electrical equipment and raceway systems.

B. Channel Type:

1. Outdoor: Type 316 stainless steel.

3.11 NAMEPLATES

A. Provide identifying nameplate on all equipment.

3.12 TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS) EQUIPMENT

A. Install in accordance with manufacturer's instructions, including lead length, overcurrent protection, and grounding.

3.13 CONDUIT AND FITTINGS

A. General:

1. Crushed or deformed raceways not permitted.
2. Maintain raceway entirely free of obstructions and moisture.
3. Immediately after installation, plug or cap raceway ends with watertight and dust-tight seals until time for pulling in conductors.
4. Sealing Fittings: Provide drain seal in vertical raceways where condensate may collect above sealing fitting.
5. Avoid moisture traps where possible. When unavoidable in exposed conduit runs, provide junction box and drain fitting at conduit low point.
6. Group raceways installed in same area.
7. Follow structural surface contours when installing exposed raceways. Avoid obstruction of passageways.
8. Run exposed raceways parallel or perpendicular to walls, structural members, or intersections of vertical planes.
9. Install watertight fittings in outdoor, underground, or wet locations.
10. Paint threads and cut ends, before assembly of fittings, galvanized conduit or PVC-coated galvanized conduit, installed in exposed or damp locations with zinc-rich paint or liquid galvanizing compound.
11. Metal conduit to be reamed, burrs removed, and cleaned before installation of conductors, wires, or cables.
12. Do not install raceways in concrete equipment pads, foundations, or beams.
13. Horizontal raceways installed under floor slabs shall lie completely under slab, with no part embedded within slab.
14. Install concealed, embedded, and buried raceways so that they emerge at right angles to surface and have no curved portion exposed. All conduit bends from underground to above ground shall be PVC coated rigid galvanized steel.

B. Installation in Cast-in-Place Structural Concrete:

1. Minimum cover 2 inches, including all fittings.
2. Conduit placement shall not require changes in reinforcing steel location or configuration.
3. Provide nonmetallic support during placement of concrete to ensure raceways remain in position.
4. Conduit larger than 1 inch shall not be embedded in concrete slabs, walls, foundations, columns or beams, unless approved by Construction Manager.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

5. Slabs and Walls:
 - a. Trade size of conduit not to exceed one-fourth of the slab or wall thickness.
 - b. Install within middle two-fourths of slab or wall.
 - c. Separate conduit less than 2-inch trade size by a minimum ten times conduit trade size, center-to-center, unless otherwise shown.
 - d. Separate conduit 2 inches and greater trade size by a minimum eight times conduit trade size, center-to-center, unless otherwise shown.
 - e. Cross conduit at an angle greater than 45 degrees, with minimum separation of 1 inch.
 - f. Separate conduit by a minimum six times the outside dimension of expansion and deflection fittings at expansion joints.
 - g. Conduit shall not be installed below the maximum water surface elevation in walls of water holding structures.
 6. Columns and Beams:
 - a. Trade size of conduit not to exceed one-fourth of beam thickness.
 - b. Conduit cross-sectional area not to exceed 4 percent of beam or column cross section.
- C. Conduit Application:
1. Diameter:
 - a. Exterior Minimum: 3/4 inch.
 - b. Interior Minimum: 3/4 inch.
 2. Outdoor, Exposed: Rigid galvanized steel.
 3. Indoor, within wash facility: PVC Coated rigid galvanized steel.
 4. Direct Earth Burial: PVC Schedule 40.
 5. Under Slabs-On-Grade:
 - a. Rigid galvanized steel.
 - b. PVC Schedule 40.
- D. Connections:
1. Outdoor areas, process areas exposed to moisture, and areas required to be oiltight and dust-tight: Flexible metal, liquid-tight conduit.
 2. Transition From Underground or Concrete Embedded to Exposed: PVC coated rigid steel conduit.
 3. Under Equipment Mounting Pads: PVC-coated rigid steel conduit.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

E. Penetrations:

1. Make at right angles, unless otherwise shown.
2. Notching or penetration of structural members, including footings and beams, not permitted.
3. Concrete Walls, Floors, or Ceilings (Aboveground): Provide non-shrink grout dry-pack.
4. Entering Structures:
 - a. General: Seal raceway at the first box or outlet with oakum or expandable plastic compound to prevent the entrance of gases or liquids from one area to another.
 - b. Concrete Roof or Membrane Waterproofed Wall or Floor: Provide watertight seal.
 - c. Nonwaterproofed Wall or Floor (Underground, without Concrete Encasement):
 - 1) Provide Schedule 40 galvanized pipe sleeve or watertight entrance seal device.
 - 2) Fill space between raceway and sleeve with expandable plastic compound or oakum and lead joint on each side.
 - d. Handholes:
 - 1) Metallic Raceways: Provide insulated grounding bushings.
 - 2) Nonmetallic Raceways: Provide bell ends flush with wall.

F. Support:

1. Support from structural members only, at intervals not exceeding NFPA 70 requirements, and in any case not exceeding 8 feet. Do not support from piping, pipe supports, or other raceways.
2. Application/Type of Conduit Strap:
 - a. Steel Conduit: Zinc-coated steel, pre-galvanized steel, or malleable iron.
 - b. Nonmetallic Conduit: Nonmetallic or PVC-coated metal.
3. Provide and attach wall brackets, strap hangers, or ceiling trapeze as follows:
 - a. Wood: Wood screws.
 - b. Hollow Masonry Units: Toggle bolts.
 - c. Concrete or Brick: Expansion shields, or threaded studs driven in by powder charge, with lock washers and nuts.
 - d. Steelwork: Machine screws.
 - e. Location/Type of Hardware:
 - 1) Corrosive Areas: Stainless steel.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

G. Bends:

1. Install concealed raceways with a minimum of bends in the shortest practical distance.
2. Make bends and offsets of longest practical radius. Bends in conduits and ducts being installed for fiber optic cables shall be not less than 20 times cable diameter, 15 inches minimum.
3. Install with symmetrical bends or cast metal fittings.
4. Avoid field-made bends and offsets, but where necessary, make with acceptable hickey or bending machine. Do not heat metal raceways to facilitate bending.
5. Make bends in parallel or banked runs from same center or centerline with same radius so that bends are parallel.
6. Factory elbows may be installed in parallel or banked raceways if there is change in plane of run and raceways are same size.
7. PVC Conduit:
 - a. Bends 30 Degrees and Larger: Provide factory-made elbows.
 - b. Use manufacturer's recommended method for forming smaller bends.
8. Flexible Conduit: Do not make bends that exceed allowable conductor bending radius of cable to be installed or that significantly restricts conduit flexibility.

H. Expansion and Deflection Fittings: Provide on all raceways at structural expansion joints and in long tangential runs.

I. PVC Conduit:

1. Solvent Welding:
 - a. Provide manufacturer recommended solvent; apply to all joints.
 - b. Install such that joint is watertight.
2. Adapters:
 - a. PVC to Metallic Fittings: PVC terminal type.
 - b. PVC to Rigid Metal Conduit or IMC: PVC female adapter.
3. Belled-End Conduit: Bevel the un-belled end of the joint prior to joining.

J. Termination at Enclosures:

1. Cast Metal Enclosure: Provide manufacturer's pre-molded insulating sleeve inside metallic conduit terminating in threaded hubs.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

2. Sheet Metal Boxes, Cabinets, and Enclosures:
 - a. Rigid Galvanized Conduit:
 - 1) Provide one lock nut each on inside and outside of enclosure.
 - 2) Install grounding bushing.
 - 3) Provide bonding jumper from grounding bushing to equipment ground bus or ground pad; if neither ground bus nor pad exists, connect jumper to lag bolt attached to metal enclosure.
 - 4) Install insulated bushing on ends of conduit where grounding is not required.
 - 5) Provide insulated throat when conduit terminates in sheet metal boxes having threaded hubs.
 - 6) Terminate conduits with threaded conduit hubs at NEMA 4 and NEMA 4X boxes and enclosures.

K. Underground Raceways:

1. All underground raceways shall be concrete encased. Refer to Section 03 30 00, Cast-in-Place Concrete, for concrete properties.
2. Grade: Maintain minimum grade of 4 inches in 100 feet, either from one manhole, handhole, or pull box to the next, or from a high point between them, depending on surface contour.
3. Cover: Maintain minimum 3-foot cover above conduit, unless otherwise shown.
4. Make routing changes as necessary to avoid obstructions or conflicts.
5. Couplings: In multiple conduit runs, stagger so couplings in adjacent runs are not in same transverse line.
6. Union type fittings not permitted.
7. Spacers:
 - a. Provide preformed, nonmetallic spacers, designed for such purpose, to secure and separate parallel conduit runs in a trench.
 - b. Install at intervals not greater than that specified in NFPA 70 for support of the type conduit used, but in no case greater than 10 feet.
8. Support conduit to prevent bending or displacement during backfilling.
9. Installation with Other Piping Systems:
 - a. Crossings: Maintain minimum 12-inch vertical separation.
 - b. Parallel Runs: Maintain minimum 12-inch separation.
 - c. Installation over valves or couplings not permitted.
10. Provide expansion fittings that allow minimum of 4 inches of movement in vertical conduit runs from underground where exposed conduit will be fastened to or will enter building or structure.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

11. Provide deflectional/expansion fittings in conduit runs that exit building or structure belowgrade. Conduit from building wall to fitting shall be PVC-coated rigid steel.
12. Backfill: As specified in Section 31 23 23.15, Trench Backfill.

L. Empty Raceways:

1. Provide permanent, removable cap over each end.
2. Provide PVC plug with pull tab for underground raceways with end bells.
3. Provide nylon pull cord.
4. Identify, as specified in Paragraph Identification Devices, with waterproof tags attached to pull cord at each end, and at intermediate pull point.

M. Identification Devices:

1. Raceway Tags:
 - a. Identify origin and destination.
 - b. Install at each terminus, near midpoint, and at minimum intervals of every 50 feet of exposed raceway, whether in ceiling space or surface mounted.
 - c. Provide nylon strap for attachment.
2. Warning Tape: Install approximately 12 inches above underground or concrete-encased raceways. Align parallel to, and within 12 inches of, centerline of runs.

N. Raceway Band: Install wherever metallic conduit emerges from concrete slabs. Center band at slab surface and install according to manufacturer's instructions.

1. Slip-on Type: Clean conduit surface at installation location. Cut tubing to 4-inch minimum lengths and slip onto raceway prior to slab placement and termination of conduit. Heat-shrink onto conduit.
2. Wrap-around Type: Use where slip-on access to conduit is not possible. Clean conduit surface at installation location. Apply primer. Apply wraps to provide two layers of tape. Neatly finish tape end to prevent unraveling.

3.14 CONDUCTORS AND CABLES

- A. Conductor storage, handling, and installation shall be in accordance with manufacturer's recommendations.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- B. Do not exceed manufacturer's recommendations for maximum pulling tensions and minimum bending radii.
- C. Conduit system shall be complete prior to drawing conductors. Lubricate prior to pulling into conduit. Lubrication type shall be as approved by conductor manufacturer.
- D. Terminate all conductors and cables, unless otherwise shown.
- E. Do not splice conductors, unless specifically indicated or approved by Construction Manager.
- F. Bundling: Where single conductors and cables in manholes, handholes, vaults, cable trays, and other indicated locations are not wrapped together by some other means, bundle conductors from each conduit throughout their exposed length with cable ties placed at intervals not exceeding 12 inches.
- G. Wiring within Equipment and Local Control Panels: Remove surplus wire, dress, bundle, and secure.
- H. Power Conductor Color Coding:
 - 1. No. 6 AWG and Larger: Apply general purpose, flame retardant tape at each end, and at accessible locations wrapped at least six full overlapping turns, covering an area 1-1/2 inches to 2 inches wide.
 - 2. No. 8 AWG and Smaller: Provide colored conductors.
 - 3. Colors:
 - a. Neutral Wire: White.
 - b. Live Wires, 120/240-Volt, Single-Phase System: Black, red.
 - c. Live Wires, 120/208-Volt, Three-Phase System: Black, red, or blue.
 - d. Live Wires, 277/480-Volt, Three-Phase System: Brown, orange, or yellow.
 - e. Ground Wire: Green.
- I. Circuit Identification:
 - 1. Circuits Appearing in Circuit Schedules: Identify power, instrumentation, and control conductor circuits, using circuit schedule designations, at each termination and in accessible locations such as manholes, handholes, panels, switchboards, motor control centers, pull boxes, and terminal boxes.
 - 2. Circuits Not Appearing in Circuit Schedules: Assign circuit name based on device or equipment at load end of circuit. Where this would result in

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

same name being assigned to more than one circuit, add number or letter to each otherwise identical circuit name to make it unique.

3. Method: Identify with sleeves. Taped-on markers or tags relying on adhesives not permitted.

J. Connections and Terminations:

1. Install wire nuts only on solid conductors.
2. Install nylon self-insulated crimp connectors and terminators for instrumentation and control circuit conductors.
3. Tape insulate all uninsulated connections.
4. Install crimp connectors and compression lugs with tools approved by connector manufacturer.

3.15 GROUNDING

- A. Grounding shall be in compliance with NFPA 70 and as shown.
- B. Ground electrical service neutral at service entrance equipment to supplementary grounding electrodes.
- C. Ground each separately derived system neutral to nearest effectively grounded building structural steel member or separate grounding electrode.
- D. Bond together system neutrals, service equipment enclosures, exposed noncurrent-carrying metal parts of electrical equipment, metal raceways, ground conductor in raceways and cables, receptacle ground connections, and metal piping systems.
- E. Equipment Grounding Conductors: Provide in all conduits containing power conductors and control circuits above 50 volts.
- F. Ground Rods: Install full length with conductor connection at upper end. Install one ground rod in each handhole.

3.16 FIELD QUALITY CONTROL

A. General:

1. Test equipment shall have an operating accuracy equal to, or greater than, requirements established by NETA ATS.
2. Test instrument calibration shall be in accordance with NETA ATS.
3. Perform inspection and electrical tests after equipment has been installed.
4. Perform tests with apparatus de-energized whenever feasible.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

5. Inspection and electrical tests on energized equipment are to be:
 - a. Scheduled with Tenant prior to de-energization.
 - b. Minimized to avoid extended period of interruption to the operating plant equipment.

- B. Tests and inspection shall establish that:
 1. Electrical equipment is operational within industry and manufacturer's tolerances.
 2. Installation operates properly.
 3. Equipment is suitable for energization.
 4. Installation conforms to requirements of Contract Documents and NFPA 70.

- C. Perform inspection and testing in accordance with NETA ATS, industry standards, and manufacturer's recommendations.

- D. Adjust mechanisms and moving parts for free mechanical movement.

- E. Adjust adjustable relays and sensors to correspond to operating conditions, or as recommended by manufacturer.

- F. Verify nameplate data for conformance to Contract Documents.

- G. Realign equipment not properly aligned and correct un-levelness.

- H. Properly anchor electrical equipment found to be inadequately anchored.

- I. Tighten accessible bolted connections, including wiring connections, with calibrated torque wrench to manufacturer's recommendations, or as otherwise specified.

- J. Clean contaminated surfaces with cleaning solvents as recommended by manufacturer.

- K. Provide proper lubrication of applicable moving parts.

- L. Investigate and repair or replace:
 1. Electrical items that fail tests.
 2. Active components not operating in accordance with manufacturer's instructions.
 3. Damaged electrical equipment.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

- M. Electrical Enclosures:
1. Remove foreign material and moisture from enclosure interior.
 2. Vacuum and wipe clean enclosure interior.
 3. Remove corrosion found on metal surfaces.
 4. Repair or replace, as determined by Construction Manager, door and panel sections having damaged surfaces.
 5. Replace missing or damaged hardware.
- N. Provide certified test report(s) documenting the successful completion of specified testing. Include field test measurement data.
- O. Test the following equipment and materials:
1. Conductors: Insulation resistance, No. 4 and larger only.
 2. Panelboards, switches, and circuit breakers.
 3. Grounding electrodes.
- P. Controls:
1. Test control and signal wiring for proper termination and function.
 2. Test local control panels and other control devices for proper terminations, configuration and settings, and functions.
 3. Demonstrate control, monitoring, and indication functions in presence of Tenant and Construction Manager.
- Q. Balance electrical load between phases on panelboards after installation.
- R. Ground and Bonding Testing:
1. Fall-of-Potential Test:
 - a. In accordance with IEEE 81, Section 8.2.1.5 for measurement of main ground system's resistance.
 - b. Main ground electrode system resistance to ground to be no greater than 5 ohm(s).
 2. Two-Point Direct Method Test:
 - a. In accordance with IEEE 81, Section 8.2.1.1 for measurement of ground resistance between main ground system, equipment frames, and system neutral and derived neutral points.
 - b. Equipment ground resistance shall not exceed main ground system resistance by 25 ohm.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

S. Voltage Testing:

1. When installation is complete and facility is in operation, check voltage at point of termination of electric utility supply system to Project.
2. Check voltage amplitude and balance between phases for loaded and unloaded conditions.
3. If unbalance exceeds 1 percent, or if voltage varies throughout the day and from loaded to unloaded conditions more than plus or minus 4 percent of nominal, make written request to electric utility to correct condition.
4. If corrections are not made, obtain written statement from a responsible electric utility official that voltage variations and/or unbalance are within their normal standards.

T. Equipment Line Current:

1. Check line current in each phase for each piece of equipment.
2. If electric utility makes adjustments to supply voltage magnitude or balance, make line current check after adjustments are made.

END OF SECTION

SECTION 26 05 70
ELECTRICAL SYSTEMS ANALYSIS

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American National Standards Institute (ANSI).
 2. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
 - a. C57.12.00, Standard General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers.
 - b. 242, Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems.
 - c. 399, Recommended Practice for Industrial and Commercial Power System Analysis.
 - d. 1584, Guide for Performing Arc Flash Hazard Calculations.
 3. National Electrical Manufacturers Association (NEMA): Z535.4, Product Safety Signs and Labels.
 4. National Fire Protection Association (NFPA):
 - a. 70, National Electrical Code (NEC).
 - b. 70E, Standard for Electrical Safety in the Workplace.
 5. Occupational Safety and Health Standards (OSHA): 29 CFR, Part 1910 Subpart S, Electrical.

1.02 SUBMITTALS

- A. Action Submittals:
1. Short circuit study.
 2. Protective Device Coordination Study: Submit within 90 days after approval of short circuit study.
 3. Arc Flash Study: Submit initial study with protective Device Coordination Study. Submit final study prior to equipment energization.
 4. Arc flash warning labels; submit sample with initial study.
 5. Electronic files of final studies including all engineering software input files, output reports, and libraries.

1.03 QUALITY ASSURANCE

- A. Short circuit and protective device coordination and arc flash studies shall be prepared by manufacturer furnishing electrical distribution equipment or professional electrical engineer registered in the State of Florida.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

1.04 SEQUENCING AND SCHEDULING

- A. Initial complete short circuit study shall be submitted and reviewed before Construction Manager will review Shop Drawings for electrical distribution equipment.
- B. Initial complete protective device coordination and arc flash studies shall be submitted within 120 days after approval of initial short circuit study.
- C. Initial complete arc flash study shall be submitted and accepted prior to energization of the electrical equipment.
- D. Revised short circuit, protective device coordination, and arc flash studies, and arc flash labels shall be submitted 10 days before energizing electrical equipment.
- E. Final short circuit, protective device coordination, and arc flash studies shall be completed prior to Project Substantial Completion. Final version of study shall include as-installed equipment, materials, and parameter data or settings entered into equipment based on study.
- F. Submit final arc flash labels described herein and in compliance with NEMA Z535.4 prior to Project Substantial Completion.

1.05 GENERAL STUDY REQUIREMENTS

- A. Equipment and component titles used in the studies shall be identical to equipment and component titles shown on the Drawings.
- B. Perform studies using one of the following electrical engineering software packages:
 - 1. SKM Power Tools for Windows.
 - 2. ETAP.
 - 3. Easy Power.
- C. Perform complete fault calculations for each proposed source combination.
 - 1. Source combination may include present power company supply circuits.
- D. Utilize proposed load data for study obtained from Contract Documents and field investigations.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

- E. Existing System and Equipment:
 - 1. Extent of existing system to be included in study is limited to system elements that affect new system and equipment.
 - 2. Include fault contribution of existing motors and equipment in study.
 - 3. Include impedance elements that affect new system and equipment.
 - 4. Include protective devices in series with new equipment.
- F. Device coordination time-current curves for low voltage distribution system; include individual protective device time-current characteristics.

1.06 SHORT CIRCUIT STUDY

- A. General:
 - 1. Prepare in accordance with IEEE 399.
 - 2. Use cable impedances based on copper conductors.
 - 3. Use bus impedances based on copper bus bars, except where aluminum bus bars are specified or shown.
 - 4. Use cable and bus resistances calculated at 25 degrees C.
 - 5. Use 600-volt cable reactances based on use of typical dimensions of THHN/THWN conductors.
 - 6. Use transformer impedances 92.5 percent of “nominal” impedance based on tolerances specified in IEEE C57.12.00.
- B. Provide:
 - 1. Calculation methods and assumptions.
 - 2. Typical calculation.
 - 3. Tabulations of calculated quantities.
 - 4. Results, conclusions, and recommendations.
 - 5. Selected base per unit quantities.
 - 6. One-line diagrams.
 - 7. Source impedance data, including electric utility system and motor fault contribution characteristics.
 - 8. Impedance diagrams.
 - 9. Zero-sequence impedance diagrams.
- C. Calculate short circuit interrupting and momentary (when applicable) duties for an assumed three-phase bolted fault at each:
 - 1. Electric utility’s supply termination point.
 - 2. Main low voltage switchboard.
 - 3. Branch circuit panelboards.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

- D. Provide bolted line-to-ground fault current study for areas as defined for three-phase bolted fault short circuit study.
- E. Provide bolted line-to-line fault current study for areas as defined for three-phase bolted fault short circuit study.
- F. Verify:
 - 1. Equipment and protective devices are applied within their ratings.
 - 2. Adequacy of electrical distribution equipment bus bars to withstand short circuit stresses.
 - 3. Cable sizes for ability to withstand short circuit heating, in addition to normal load currents.
- G. Tabulations:
 - 1. General Data:
 - a. Cable and conduit material data.
 - b. Bus data.
 - c. Transformer data.
 - d. Circuit resistance and reactance values.
 - 2. Short Circuit Data:
 - a. Fault impedances.
 - b. X to R ratios.
 - c. Asymmetry factors.
 - d. Short circuit kVA.
 - e. Symmetrical and asymmetrical fault currents.
 - 3. Equipment Evaluation:
 - a. Equipment bus bracing, equipment short circuit rating, transformer, cable, busway.
 - b. Maximum fault current available.
- H. Written Summary:
 - 1. Scope of studies performed.
 - 2. Explanation of bus and branch numbering system.
 - 3. Prevailing conditions.
 - 4. Selected equipment deficiencies.
 - 5. Results of short circuit study.
 - 6. Comments or suggestions.
- I. Suggest changes and additions to equipment rating and/or characteristics.

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- J. Notify Owner in writing of existing circuit protective devices improperly rated for new fault conditions.
- K. Revise data for “as-installed” condition.

1.07 PROTECTIVE DEVICE COORDINATION STUDY

A. General:

- 1. Prepare in accordance with IEEE 242.
- 2. Proposed protective device coordination time-current curves for distribution system, graphically displayed on conventional log-log curve sheets.
 - a. Provide separate curve sheets for phase and ground fault coordination for each scenario.
 - b. Each curve sheet to have title and one-line diagram that applies to specific portion of system associated with time-current curves on that sheet. Limit number of devices shown to four to six.
 - c. Identify device associated with each curve by manufacturer type, function, and, if applicable, recommended tap, time delay, instantaneous and other settings recommended.
 - d. Terminate device characteristic curves at a point reflecting maximum symmetrical or asymmetrical fault current to which device is exposed.
 - e. Apply motor protection methods that comply with NFPA 70.

B. Plot Characteristics on Curve Sheets:

- 1. Low-voltage equipment circuit breaker trip devices, including manufacturers tolerance bands.
- 2. Pertinent transformer full-load currents at 100 percent.
- 3. Transformer magnetizing inrush currents.
- 4. Transformer damage curves; appropriate for system operation and location.
- 5. ANSI transformer withstand parameters.
- 6. Significant symmetrical and asymmetrical fault currents.
- 7. Ground fault protective device settings.
- 8. Other system load protective devices for largest branch circuit and feeder circuit breaker in each motor control center.

C. Primary Protective Device Settings for Delta-Wye Connected Transformer:

- 1. Secondary Line-to-Ground Fault Protection: Primary protective device operating band within transformer’s characteristics curve, including a point equal to 58 percent of IEEE C57.12.00 withstand point.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

2. Secondary Line-to-Line Faults: 16 percent current margin between primary protective device and associated secondary device characteristic curves.

D. Tabulate Recommended Protective Device Settings:

1. Relays:
 - a. Current tap.
 - b. Time dial.
 - c. Instantaneous pickup.
 - d. Electronic settings data file.
2. Circuit Breakers:
 - a. Adjustable pickups.
 - b. Adjustable time-current characteristics.
 - c. Adjustable time delays.
 - d. Adjustable instantaneous pickups.
 - e. I²t In/Out.
 - f. Zone interlocking.
 - g. Electronic settings data file.

E. Written Summary:

1. Scope of studies performed.
2. Summary of protective device coordination methodology.
3. Prevailing conditions.
4. Selected equipment deficiencies.
5. Results of coordination study.
6. Appendix of complete relay and circuit breaker electronic setting files.
7. Comments or suggestions.

1.08 ARC FLASH STUDY

- A. Perform arc flash hazard study after short circuit and protective device coordination study has been completed, reviewed and accepted.
- B. Perform arc flash study in accordance with NFPA 70E, OSHA 29 CFR, Part 1910 Subpart S, and IEEE 1584.
- C. Base Calculation:
 1. For each major part of electrical power system, determine the following:
 - a. Flash hazard protection boundary.
 - b. Limited approach boundary.
 - c. Restricted approach boundary.

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- d. Incident energy level.
 - e. Glove class required.
- D. Produce arc flash warning labels that list items in Paragraph Base Calculation and the following additional items.
1. Bus name.
 2. Bus voltage.
- E. Produce bus detail sheets that list items in Paragraph Base Calculation and the following additional items:
1. Bus name.
 2. Upstream protective device name, type, and settings.
 3. Bus line-to-line voltage.
- F. Produce arc flash evaluation summary sheet listing the following additional items:
1. Bus name.
 2. Upstream protective device name, type, settings.
 3. Bus line-to-line voltage.
 4. Bus bolted fault.
 5. Protective device bolted fault current.
 6. Arcing fault current.
 7. Protective device trip/delay time.
 8. Breaker opening time.
 9. Solidly grounded column.
 10. Equipment type.
 11. Gap.
 12. Arc flash boundary.
 13. Working distance.
 14. Incident energy.
- G. Analyze short circuit, protective device coordination, and arc flash calculations and highlight equipment that is determined to be underrated or causes incident energy values greater than 40 cal/cm². Propose approaches to reduce energy levels.
- H. Prepare report summarizing arc flash study with conclusions and recommendations which may affect integrity of electric power distribution system. As a minimum, include the following:
1. Equipment manufacturer's information used to prepare study.
 2. Assumptions made during study.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

3. Reduced copy of one-line drawing; 11 inches by 17 inches maximum.
4. Arc flash evaluations summary spreadsheet.
5. Bus detail sheets.
6. Arc flash warning labels printed in color on thermally bonded adhesive backed UV and weather-resistant labels.

PART 2 PRODUCTS

2.01 ARC FLASH WARNING LABELS

- A. Arc flash warning labels printed in color on thermally bonded adhesive backed, UV-resistant and weather-resistant labels. An example label is located following end of section in Figure 1.

PART 3 EXECUTION

3.01 GENERAL

- A. Adjust protective device settings according to values established by coordination study.
- B. Make minor modifications to equipment as required to accomplish conformance with short circuit and protective device coordination studies.
- C. Notify Construction Manager in writing of required major equipment modifications.
- D. Provide laminated one-line diagrams (minimum size 11 inches by 17 inches) to post on interior of electrical room doors.
- E. Provide arc flash warning labels on equipment as specified in this section.

3.02 SUPPLEMENT

- A. The supplement listed below, following “End of Section,” is a part of this specification:
 1. Figure 1: Example Arc Flash Label.

END OF SECTION

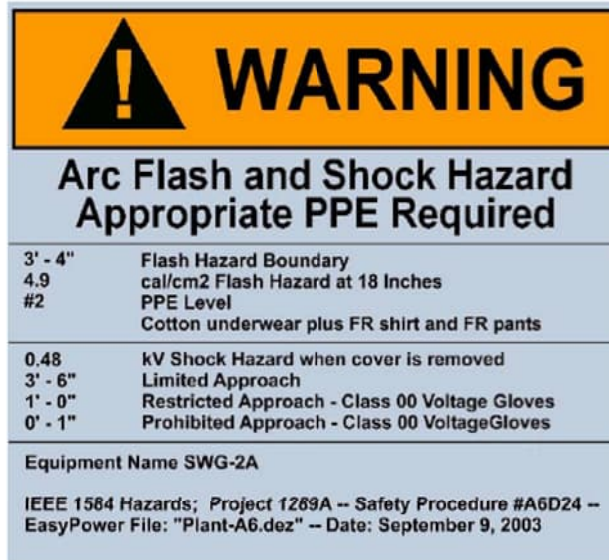


Figure 1
Example Arc Flash Label

SECTION 26 41 00
FACILITY LIGHTNING PROTECTION

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. Lightning Protection Institute (LPI): 175, Standard of Practice.
 2. National Fire Protection Association (NFPA):
 - a. 70, National Electrical Code (NEC).
 - b. 780, Standard for the Installation of Lightning Protection Systems.
 3. UL:
 - a. 96, Standard for Lightning Protection Components.
 - b. 96A, Standard for Installation Requirements for Lightning Protection Systems.

1.02 DESIGN REQUIREMENTS

- A. Provide lightning protection system design for the equipment wash facility by a licensed Lightning Protection System design and installation company.
- B. Design lightning protection system to comply with applicable provisions of LPI 175, UL 96, UL 96A, and NFPA 780.

1.03 SUBMITTALS

- A. Action Submittals:
1. Lightning protection system layout including component layouts and detailed plans.
 2. Down conductor.
 3. Connecting conductor.
 4. Bond strap.
 5. Air terminals.
 6. Fittings.
 7. Connectors.
 8. Ground rods.
- B. Informational Submittals:
1. Field test report.
 2. Ground Witness Certification-Form LPI-175A.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3. Post-Installation Certification-Form LPI-175B.
4. UL 96 Master Label "C" Certification.

1.04 QUALITY ASSURANCE

- A. Designer: Lightning protection system design shall be prepared by an LPI-certified master designer. Shop drawings shall be stamped by the designer.
- B. System components shall be the product of a manufacturer regularly engaged in the manufacturing of lightning protection components in accordance with UL 96.
- C. Lightning protection system shall be installed under direct supervision of an LPI 175 Certified Master Installer.
- D. Inspection of final installation and grounding connection shall be performed by an LPI-certified inspector.
- E. Provide the Work in accordance with NFPA 70. Where required by Authority Having Jurisdiction (AHJ), material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ in order to provide a basis for approval under NEC.
- F. Materials and equipment manufactured within the scope of standards published by UL shall conform to those standards and shall have an applied UL listing mark.

PART 2 PRODUCTS

2.01 GENERAL

- A. Complete system shall bear UL 96 Master Label C.
- B. System Material: Aluminum unless otherwise specified.
- C. Material shall comply in weight, size, and composition for the class of structure to be protected as established by NFPA 780.

2.02 COMPONENTS

- A. Air Terminal:
 1. Material: Solid aluminum with tapered or blunt points as required for application.

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2. Length: Sufficient to extend minimum 12 inches above object being protected.
 3. UL 96 Label B applied to each terminal.
- B. Conductors:
1. Lightning System Conductors: Bare medium hard-drawn stranded copper, or stranded aluminum as required for the application.
 2. Main Down Conductor: Smooth twist stranding: Class 1.
 3. Connecting Conductor: Concentric standing, Class 1.
 4. Main down and connecting conductors shall bear the UL 96 Label A, applied every 10 feet.
 5. Grounding Conductors: Stranded bare copper.
- C. Cable Fastener and Accessories: Capable of withstanding minimum pull of 100 pounds.
- D. Fittings:
1. Heavy-duty.
 2. Bolts, Screws, and Related Hardware: Stainless steel.
- E. Ground Rods: Refer to Section 26 05 01, Electrical.
- F. Grounding Connections:
1. Welds: Exothermic process.
 2. Fasteners: Bolted clamp type, corrosion-resistant copper alloy.
 3. Hardware: Silicone bronze.
- G. Cable Connections and Splicers:
1. Welds: Exothermic process.
 2. Fasteners: Bolted clamp type, corrosion-resistant copper alloy.
 3. Through-Roof Connectors: Straight or right angle with bronze and lead seal flashing washer.
- H. Conduit: Schedule 40 PVC, as specified in Section 26 05 01, Electrical.

PART 3 EXECUTION

3.01 GENERAL

- A. Workmanship to comply with all applicable provisions of LPI 175, UL 96, UL 96A, and NFPA 780.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

- B. Aluminum materials shall be used where required to meet the galvanic corrosion requirements of UL 96A.
- C. Provide pitch pockets or method compatible with roofing to waterproof roof penetrations.
- D. Install system in inconspicuous manner so components blend with building aesthetics.

3.02 EXAMINATION

- A. Verify conditions prior to installation. Actual conditions may require adjustments in air terminal and ground rod locations.

3.03 INSTALLATION

A. Air Terminals:

- 1. Supports: Brackets or braces.
- 2. Secure base to roof surface with adhesive or pitch compatible with roofing bond.
- 3. Provide terminal flashing at roof penetrations.
- 4. Perimeter Terminals:
 - a. Maximum Spacing: 20 feet.
 - b. Maximum Distance From Outside Edge of Building: 2 feet.
- 5. Roof Ridge Terminals: Maximum spacing 20 feet.
- 6. Mid-Roof Terminals: Maximum spacing 50 feet.
- 7. Provide blunt point air terminals for applications exposed to personnel.

B. Conductors:

- 1. Conceal whenever practical.
- 2. Provide 1-inch PVC conduit in building walls or columns for main downloads and roof risers.
- 3. Support: Maximum spacing for exposed conductors.
 - a. Vertical: 3 foot.
 - b. Horizontal: 4 foot.
- 4. Maintain horizontal and vertical conductor courses free from dips or pockets.
- 5. Bends: Maximum 90 degrees, with minimum 8-inch radius.
- 6. Install air terminal conductors on the structural roof surface before roofing composition is applied.

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C. Bonding:

1. Bond to Main Conductor System:
 - a. Roof-mounted ventilators, fans, air handlers, masts, flues, cooling towers, handrails, and other sizeable metal objects.
 - b. Roof flashing, gravel stops, insulation vents, ridge vents, roof drains, soil pipe vents, and other small metal objects if located within 6 feet of main conductors or another grounded object.
2. Bond each steel column or major framing members to grounding system.
3. Bond each main down conductor to grounding system.

D. Grounding System:

1. Grounding Conductor:
 - a. Completely encircle building structure.
 - b. Bury minimum 1 foot below finished grade.
 - c. Minimum 2 feet from foundation walls.
2. Interconnect ground rods by direct-buried copper cables.
3. Maximum Resistance: 5 ohms when connected to ground rods.
4. Connections:
 - a. Install ground cables continuous between connections.
 - b. Exothermic welded connections to ground rods, cable trays, structural steel, handrails, and buried and non-accessible connections.
 - c. Provide bolted clamp type mechanical connectors for all exposed secondary connections.
 - d. Use bolted offset parapet bases or through-roof concealed base assemblies for air terminal connections.

3.04 FIELD QUALITY CONTROL

A. Field Testing:

1. Isolate lightning protection system from other ground conditions while performing tests.
2. Resistance: Test ground resistance of grounding system by the fall-of-potential method.
 - a. Test Resistance to Ground: Maximum 5 ohms.
 - b. Install additional ground rods as required to obtain maximum allowable resistance.
3. Test Report:
 - a. Description of equipment tested.
 - b. Description of test.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

- c. Test results.
- d. Conclusions and recommendations.
- e. Appendix, including appropriate test forms.
- f. Identification of test equipment used.
- g. Signature of responsible test organization authority.

END OF SECTION

SECTION 31 23 13
SUBGRADE PREPARATION

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):
 - a. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft³ (600 kN-m/m³)).
 - b. D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).

1.02 DEFINITIONS

- A. Optimum Moisture Content: As defined in Section 31 23 23, Fill and Backfill.
- B. Prepared Ground Surface: Ground surface after completion of clearing and grubbing, scalping of sod, stripping of topsoil, excavation to grade, and scarification and compaction of subgrade.
- C. Relative Compaction: As defined in Section 31 23 23, Fill and Backfill.
- D. Relative Density: As defined in Section 31 23 23, Fill and Backfill.
- E. Subgrade: Layer of existing soil after completion of demolition of existing pavement section prior to placement of fill, pavement structure or base for building foundations.

1.03 SEQUENCING AND SCHEDULING

- A. Complete applicable Work specified in Section 02 41 00, Demolition; and Section 31 23 16, Excavation, prior to subgrade preparation.

1.04 QUALITY ASSURANCE

- A. Subgrade shall be compacted to achieve a minimum CBR of 15.
- B. If loose soils or soft clays are encountered in the subgrade zone, then the unsuitable material shall be excavated to a depth of 4 feet below the base of the proposed pavement section.

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- C. All fill and backfill used to replace unsuitable material should consist of structural fill that is relatively free-draining, such as poorly graded sand (SP), poorly graded sand with silt (SP-SM), and silty sand (SM). Suitable fill and limerock stockpiled following demolition of the existing pavement can be used for this purpose.
- D. Structural fill shall be placed and spread in layers not to exceed 8-inch loose lifts and moisture conditioned within 2 percent of optimum moisture content during compaction.
- E. Once the prepared subgrade is completed, dynamic cone penetrometer testing is required to verify that in situ CBR values meet or exceed 15. The test shall be conducted in accordance with ASTM D6951/D6951M-18 (ASTM, 2018) to depths up to 5 feet below subgrade surface. One test is recommended per 2 acres of pavement subgrade preparation. The tests shall be conducted between boring locations shown in the Geotechnical Design Report, or as directed by the Construction Manager.
- F. Notify Construction Manager when subgrade is ready for compaction or proof-rolling or whenever compaction or proof-rolling is resumed after a period of extended inactivity.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

- A. Keep subgrade free of water, debris, and foreign matter during compaction or proof-rolling.
- B. Bring subgrade to proper grade and cross-section and uniformly compact surface.
- C. Do not use sections of prepared ground surface as haul roads. Protect prepared subgrade from traffic.
- D. Maintain prepared ground surface in finished condition until next course is placed.

3.02 COMPACTION

- A. Under Earthfill: Compact upper 8 inches to minimum of 95 percent relative compaction as determined in accordance with ASTM D1557.

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- B. Under Pavement Structure or Granular Fill Under Structures: Compact the upper 8 inches to minimum of 95 percent relative compaction as determined in accordance with ASTM D1557.

3.03 MOISTURE CONDITIONING

- A. Dry Subgrade: Add water, then mix to make moisture content uniform throughout.
- B. Wet Subgrade: Aerate material by blading, discing, harrowing, or other methods, to hasten drying process.

3.04 CORRECTION

- A. Soft or Loose Subgrade:
 - 1. Adjust moisture content and recompact.
 - 2. Over excavate as specified in Section 31 23 16, Excavation, and replace with suitable material from stockpiled limerock, as specified in Article Quality Assurance.
 - 3. Unsuitable Material: Over excavate as specified in Section 31 23 16, Excavation, and replace with suitable material from stockpiled limerock, as specified in Article Quality Assurance.

END OF SECTION

SECTION 31 23 16
EXCAVATION

PART 1 GENERAL

1.01 DEFINITIONS

- A. Common Excavation: Removal of material not classified as rock excavation.
- B. Rock Excavation:
 - 1. General: Removal of solid material which by actual demonstration cannot, in Construction Manager's opinion, be reasonably loosened or ripped by single-tooth, hydraulically operated ripper mounted on crawler tractor in good condition and rated at minimum 300 flywheel horsepower; and which must be systematically drilled and blasted or broken by power-operated hammer, hydraulic rock breaker, expansive compounds, or other similar means prior to removal.
 - 2. Trench: Removal of solid material which by actual demonstration cannot, in Construction Manager's opinion, be reasonably excavated with minimum 135 hp backhoe in good condition and equipped with manufacturer's standard boom, two rippers, and rock points or similar approved equipment; and which must be systematically drilled and blasted or broken by power-operated hammer, hydraulic rock breaker, expansive compounds, or other similar means prior to removal.
 - 3. Term "rock excavation" indicates removal of solid material, as specified above, and does not necessarily correspond to "rock" as implied by names of geologic formations.
 - 4. Removal of boulders larger than 1/2 cubic yard will be classified as rock excavation, if drilling and blasting or breaking them apart with power-operated hammer, hydraulic rock breaker, expansive compounds, or other similar means is both necessary and actually used for their removal.

1.02 SUBMITTALS

- A. Informational Submittals:
 - 1. Excavation Plan, Detailing:
 - a. Methods and sequencing of excavation.
 - b. Proposed locations of stockpiled excavated material.
 - c. Proposed onsite and offsite spoil disposal sites.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

1.03 QUALITY ASSURANCE

- A. Provide adequate survey control to avoid unauthorized overexcavation.

1.04 WEATHER LIMITATIONS

- A. Material excavated during inclement weather shall not be used as fill or backfill until after material drains and dries sufficiently for proper compaction.

1.05 SEQUENCING AND SCHEDULING

- A. Demolition: Complete applicable Work specified in Section 02 41 00, Demolition.
- B. Dewatering: Conform to applicable requirements of Section 31 23 19.01, Dewatering, prior to initiating excavation.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

- A. Excavate to lines, grades, and dimensions shown and as necessary to accomplish Work. Excavate to within tolerance of plus or minus 0.1 foot, except where dimensions or grades are shown or specified as maximum or minimum. Allow for forms, working space, granular base, topsoil, and similar items, wherever applicable. Trim to neat lines where concrete is to be deposited against earth.
- B. Do not overexcavate without written authorization of Construction Manager.
- C. Remove or protect obstructions as shown and as specified in Section 01 50 00, Temporary Facilities and Controls, Article Protection of Work and Property.
- D. Use of explosives shall not be allowed.

3.02 UNCLASSIFIED EXCAVATION

- A. Excavation is unclassified. Complete all excavation regardless of the type, nature, or condition of the materials encountered.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3.03 TRENCH WIDTH

- A. Minimum Width of Trenches:
 - 1. Single Pipes, Conduits, Direct-Buried Cables, and Duct Banks:
 - a. Less than 4-inch Outside Diameter or Width: 18 inches.
 - b. Greater than 4-inch Outside Diameter or Width: 18 inches greater than outside diameter or width of pipe, conduit, direct-buried cable, or duct bank.
 - 2. Multiple Pipes, Conduits, Cables, or Duct Banks in Single Trench: 18 inches greater than aggregate width of pipes, conduits, cables, duct banks, plus space between.
 - 3. Increase trench widths by thicknesses of sheeting.
- B. Maximum Trench Width: Unlimited, unless otherwise shown or specified, or unless excess width will cause damage to existing facilities, adjacent property, or completed Work. Pipe of greater strength or superior pipe bedding, when approved in writing by Construction Manager, may be used in lieu of maintaining the pipe widths shown or specified.

3.04 PIPE BEDDING GROOVES FOR NONPERFORATED DRAIN LINES

- A. Semicircular, trapezoidal, or 90-degree-V.
- B. Excavated or plowed into trench bottom. Forming groove by compaction will not be acceptable.

3.05 EMBANKMENT AND CUT SLOPES

- A. Shape, trim, and finish cut slopes to conform with lines, grades, and cross-sections shown, with proper allowance for topsoil or slope protection, where shown.
- B. Remove stones and rock that exceed 3-inch diameter and that are loose and may roll down slope. Remove exposed roots from cut slopes.
- C. Round tops of cut slopes in soil to not less than a 6-foot radius, provided such rounding does not extend offsite or outside easements and rights-of-way, or adversely impacts existing facilities, adjacent property, or completed Work.

3.06 STOCKPILING EXCAVATED MATERIAL

- A. Stockpile excavated material that is suitable for use as fill or backfill until material is needed.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- B. Post signs indicating proposed use of material stockpiled. Post signs that are readable from all directions of approach to each stockpile. Signs should be clearly worded and readable by equipment operators from their normal seated position.
- C. Confine stockpiles to within easements, rights-of-way, and approved work areas. Do not obstruct roads or streets.
- D. Do not stockpile excavated material adjacent to trenches and other excavations, unless excavation side slopes and excavation support systems are designed, constructed, and maintained for stockpile loads.
- E. Do not stockpile excavated materials near or over existing facilities, adjacent property, or completed Work, if weight of stockpiled material could induce excessive settlement.

3.07 DISPOSAL OF SPOIL

- A. Dispose of excavated materials, which are unsuitable or exceed quantity needed for fill or backfill, offsite.
- B. Dispose of debris resulting from removal of underground facilities as specified in Section 02 41 00, Demolition, for demolition debris.

END OF SECTION

**SECTION 31 23 19.01
DEWATERING**

PART 1 GENERAL

1.01 SUBMITTALS

A. Informational Submittals:

1. Water control plan.
2. Discharge permits.
3. Settlement Benchmark Elevations: Submit weekly record.
4. Inflow Measurements: Submit weekly record.

1.02 WATER CONTROL PLAN

A. As a minimum, include:

1. Descriptions of proposed groundwater and surface water control facilities including, but not limited to, equipment; methods; standby equipment and power supply, means of measuring inflow to excavations, pollution control facilities, discharge locations to be utilized, and provisions for immediate temporary water supply as required by this section.
2. Drawings showing locations, dimensions, and relationships of elements of each system.
3. Design calculations demonstrating adequacy of proposed dewatering systems and components.

B. If system is modified during installation or operation revise or amend and resubmit Water Control Plan.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

- A. Continuously control water during course of construction, including weekends and holidays and during periods of work stoppages, and provide adequate backup systems to maintain control of water.
- B. For Other Portions of Project: Remove and control water during periods when necessary to properly accomplish Work.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3.02 SURFACE WATER CONTROL

- A. See Section 01 50 00, Temporary Facilities and Controls, Article Temporary Controls.
- B. Remove surface runoff controls when no longer needed.

3.03 DEWATERING SYSTEMS

- A. Provide, operate, and maintain dewatering systems of sufficient size and capacity to permit excavation and subsequent construction in dry and to lower and maintain groundwater level a minimum of 2 feet below the lowest point of excavation. Continuously maintain excavations free of water, regardless of source, and until backfilled to final grade.
- B. Design and Operate Dewatering Systems:
 - 1. To prevent loss of ground as water is removed.
 - 2. To avoid inducing settlement or damage to existing facilities, completed Work, or adjacent property.
 - 3. To relieve artesian pressures and resultant uplift of excavation bottom.
- C. Provide sufficient redundancy in each system to keep excavation free of water in event of component failure.
- D. Provide 100 percent emergency power backup with automatic startup and switchover in event of electrical power failure.
- E. Provide supplemental ditches and sumps only as necessary to collect water from local seeps. Do not use ditches and sumps as primary means of dewatering.

3.04 DISPOSAL OF WATER

- A. Obtain discharge permit for water disposal from authorities having jurisdiction.
- B. Treat water collected by dewatering operations, as required by regulatory agencies, prior to discharge.
- C. Discharge water as required by discharge permit and in manner that will not cause erosion or flooding, or otherwise damage existing facilities, completed Work, or adjacent property.
- D. Remove solids from treatment facilities and perform other maintenance of treatment facilities as necessary to maintain their efficiency.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3.05 PROTECTION OF PROPERTY

- A. Make assessment of potential for dewatering induced settlement. Provide and operate devices or systems, including but not limited to reinjection wells, infiltration trenches and cutoff walls, necessary to prevent damage to existing facilities, completed Work, and adjacent property.
- B. Securely support existing facilities, completed Work, and adjacent property vulnerable to settlement due to dewatering operations. Support shall include, but not be limited to, bracing, underpinning, or compaction grouting.

3.06 REMEDIATION OF GROUNDWATER DEPLETION

- A. If dewatering reduces quantity or quality of water produced by existing wells, temporarily supply water to affected well owners from other sources. Furnish water of a quality and quantity equal to or exceeding the quality and quantity available to well owner prior to beginning the Work or as satisfactory to each well owner.

END OF SECTION

SECTION 31 23 23
FILL AND BACKFILL

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):
 - a. C117, Standard Test Method for Materials Finer Than 75-Micrometers (No. 200) Sieve in Mineral Aggregates by Washing.
 - b. C136, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
 - c. D75, Standard Practice for Sampling Aggregates.
 - d. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - e. D1556, Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
 - f. D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 - g. D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
 - h. D4254, Standard Test Method for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
 - i. D6938, Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.02 DEFINITIONS

A. Relative Compaction:

1. Ratio, in percent, of as-compacted field dry density to laboratory maximum dry density as determined in accordance with ASTM D1557.
2. Apply corrections for oversize material to either as-compacted field dry density or maximum dry density, as determined by Construction Manager.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- B. Optimum Moisture Content:
 - 1. Determined in accordance with ASTM Standard specified to determine maximum dry density for relative compaction.
 - 2. Determine field moisture content on basis of fraction passing 3/4-inch sieve.
- C. Relative Density: Calculated in accordance with ASTM D4254 based on maximum index density determined in accordance with ASTM D4253 and minimum index density determined in accordance with ASTM D4254.
- D. Prepared Ground Surface: Ground surface after completion of required demolition, clearing and grubbing, scalping of sod, stripping of topsoil, excavation to grade, and subgrade preparation.
- E. Completed Course: A course or layer that is ready for next layer or next phase of Work.
- F. Lift: Loose (uncompacted) layer of material.
- G. Geosynthetics: Geotextiles, geogrids, or geomembranes.
- H. Well-Graded:
 - 1. A mixture of particle sizes with no specific concentration or lack thereof of one or more sizes.
 - 2. Does not define numerical value that must be placed on coefficient of uniformity, coefficient of curvature, or other specific grain size distribution parameters.
 - 3. Used to define material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids.
- I. Influence Area:
 - 1. Area within planes sloped downward and outward at 60-degree angle from horizontal measured from:
 - a. 1 foot outside outermost edge at base of foundations or slabs.
 - b. 1 foot outside outermost edge at surface of roadways or shoulder.
 - c. 0.5 foot outside exterior at spring line of pipes or culverts.
- J. Imported Material: Materials obtained from sources offsite, suitable for specified use.
- K. Structural Fill: Fill materials as required under structures, pavements, and other facilities.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- L. Embankment Material: Fill materials required to raise existing grade in areas other than under structures.
- M. Standard Specifications: When referenced in this section, shall mean Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, January 2024.

1.03 SUBMITTALS

- A. Informational Submittals:
 - 1. Manufacturer's data sheets for compaction equipment.
 - 2. Certified test results from independent testing agency.

1.04 QUALITY ASSURANCE

- A. Notify Construction Manager when:
 - 1. Structure is ready for backfilling, and whenever backfilling operations are resumed after a period of inactivity.
 - 2. Soft or loose subgrade materials are encountered wherever embankment or site fill is to be placed.
 - 3. Fill material appears to be deviating from Specifications.

1.05 SEQUENCING AND SCHEDULING

- A. Complete applicable Work specified in Section 02 41 00, Demolition; Section 31 23 16, Excavation; and Section 31 23 13, Subgrade Preparation, prior to placing fill or backfill.
- B. Backfill against concrete structures only after concrete has attained compressive strength, specified in Section 03 30 00, Cast-in-Place Concrete. Obtain Construction Manager's acceptance of concrete work and attained strength prior to placing backfill.
- C. Do not place granular base, subbase, or surfacing until after subgrade has been prepared as specified in Section 31 23 13, Subgrade Preparation.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

PART 2 PRODUCTS

2.01 SOURCE QUALITY CONTROL

A. Gradation Tests:

1. As necessary to locate acceptable sources of imported material.
2. During production of imported material, test as follows:
 - a. Granular Fill: One sample per 2,000 cubic yards.
 - b. Sand: One sample per 2,000 cubic yards.
 - c. Granular Drain Material: One test per source.
 - d. Base Course Rock: One sample per 5,000 cubic yards.
 - e. Foundation Stabilization Rock: One test per source per 1,000 tons.
 - f. Soil Cover Over Geotextiles: One test per 100 cubic yards.

2.02 EARTHFILL

- A. Excavated material from required excavations and designated borrow sites, free from rocks larger than 3 inches, from roots and other organic matter, ashes, cinders, trash, debris, and other deleterious materials.
- B. Material containing more than 10 percent gravel, stones, or shale particles is unacceptable.
- C. Provide imported material of equivalent quality, if required to accomplish Work.

2.03 GRANULAR FILL

- A. Base course material, as specified in Section 32 11 23, Aggregate Base and Subbase Courses.

2.04 SAND

- A. Free from clay, organic matter, or other deleterious material.
- B. Gradation as determined in accordance with ASTM C117 and ASTM C136:

Sieve Size	Percent Passing by Weight
1/4-inch	100
No. 4	95 - 100
No. 200	0 - 8

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

2.05 GRANULAR DRAIN MATERIAL

- A. As specified in Section 31 23 23.15, Trench Backfill.

2.06 BASE COURSE ROCK

- A. As specified in Section 32 11 23, Aggregate Base and Subbase Courses.

2.07 FOUNDATION STABILIZATION ROCK

- A. Clean gravel or crushed rock, reasonably well-graded from coarse to fine.
- B. Maximum Particle Size: 3-inch.

2.08 SOIL COVER OVER GEOTEXTILES

- A. Particle Size: Maximum 1 inch.
- B. Free of sharp angular pieces that may damage geotextile.

PART 3 EXECUTION

3.01 GENERAL

- A. Keep placement surfaces free of water, debris, and foreign material during placement and compaction of fill and backfill materials.
- B. Place and spread fill and backfill materials in horizontal lifts of uniform thickness, in a manner that avoids segregation, and compact each lift to specified densities prior to placing succeeding lifts. Slope lifts only where necessary to conform to final grades or as necessary to keep placement surfaces drained of water.
- C. During filling and backfilling, keep level of fill and backfill around each structure and buried tank even.
- D. If pipe, conduit, duct bank, or cable is to be laid within fill or backfill:
 - 1. Fill or backfill to an elevation 2 feet above top of item to be laid.
 - 2. Excavate trench for installation of item.
 - 3. Install bedding, if applicable, as specified in Section 31 23 23.15, Trench Backfill.
 - 4. Install item.
 - 5. Backfill envelope zone and remaining trench, as specified in Section 31 23 23.15, Trench Backfill, before resuming filling or backfilling specified in this section.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- E. Tolerances:
 - 1. Final Lines and Grades: Within a tolerance of 0.1 foot unless dimensions or grades are shown or specified otherwise.
 - 2. Grade to establish and maintain slopes and drainage as shown. Reverse slopes are not permitted.
- F. Settlement: Correct and repair any subsequent damage to structures, pavements, curbs, slabs, piping, and other facilities, caused by settlement of fill or backfill material.

3.02 BACKFILL UNDER AND AROUND STRUCTURES

- A. Under Facilities: Within influence area beneath structures, slabs, pavements, curbs, piping, conduits, duct banks, and other facilities, backfill with granular fill, unless otherwise shown. Place granular fill in lifts of 6-inch maximum thickness and compact each lift to minimum of 95 percent relative compaction as determined in accordance with ASTM D1557.
- B. Subsurface Drainage: Backfill with granular drain material, where shown. Place granular drain material in lifts of 6-inch maximum thickness and compact each lift to minimum of 90 percent relative density.
- C. Other Areas: Backfill with earthfill to lines and grades shown, with proper allowance for topsoil thickness where shown. Place in lifts of 6-inch maximum thickness and compact each lift to minimum 95 percent relative compaction as determined in accordance with ASTM D1557.
- D. Foundation Stabilization Rock: Including open-graded aggregate, No. 57 Stone and other aggregates which lack fines. Compact and proof roll with six passes of a loaded 15-ton pneumatic roller using 6-inch lifts.

3.03 FILL

- A. Outside Influence Areas beneath Structures, Pavements, Curbs, Slabs, Piping, and Other Facilities:
 - 1. Unless otherwise shown, place earthfill as follows:
 - a. Allow for 6-inch thickness of topsoil where required.
 - b. Maximum 8-inch thick lifts.
 - c. Place and compact fill across full width of embankment.
 - d. Compact to minimum 95 percent maximum dry density as determined in accordance with ASTM D1557. The exception shall be the uppermost 2 feet of fill under pavement which shall be

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

compacted to 95 percent maximum dry density in accordance with ASTM D1557.

- e. Dress completed embankment with allowance for topsoil, crest surfacing, and slope protection, where applicable.

3.04 SITE TESTING

A. Gradation:

- 1. One sample from each 1,500 tons of finished product or more often as determined by Construction Manager, if variation in gradation is occurring, or if material appears to depart from Specifications.
- 2. If test results indicate material does not meet Specification requirements, terminate material placement until corrective measures are taken.
- 3. Remove material placed in Work that does not meet Specification requirements.

B. In-Place Density Tests:

- 1. In accordance with ASTM D1556. During placement of materials, test as follows:
 - a. Granular Fill: One test per two lifts below structures.
 - b. Sand: One test per two lifts below structures.
 - c. Base Course Rock: One per 10,000 square feet per lift.
 - d. Foundation Stabilization Rock: Proof roll, as specified.

3.05 GRANULAR BASE, SUBBASE, AND SURFACING

- A. Place and compact as specified in Section 32 11 23, Aggregate Base and Subbase Courses.

3.06 REPLACING OVEREXCAVATED MATERIAL

- A. Replace excavation carried belowgrade lines shown or established by Construction Manager as follows:
 - 1. Beneath Footings: As specified in Article Foundation Stabilization Rock.
 - 2. Beneath Fill or Backfill: Same material as specified for overlying fill or backfill.
 - 3. Beneath Slabs-On-Grade: Granular fill.
 - 4. Trenches:

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- a. Unauthorized Overexcavation: Either trench stabilization material or granular pipe base material, as specified in Section 31 23 23.15, Trench Backfill.
 - b. Authorized Overexcavation: Trench stabilization material, as specified in Section 31 23 23.15, Trench Backfill.
5. Permanent Cut Slopes (Where Overlying Area is Not to Receive Fill or Backfill):
- a. Flat to Moderate Steep Slopes (3:1, Horizontal Run: Vertical Rise or Flatter): Earthfill.
 - b. Steep Slopes (Steeper than 3:1):
 - 1) Correct overexcavation by transitioning between overcut areas and designed slope adjoining areas, provided such cutting does not extend offsite or outside easements and right-of-ways, or adversely impacts existing facilities, adjacent property, or completed Work.
 - 2) Backfilling overexcavated areas is prohibited, unless in Construction Manager's opinion, backfill will remain stable, and overexcavated material is replaced as compacted earthfill.

3.07 ACCESS ROAD SURFACING

- A. Place and compact as specified in Section 32 11 23, Aggregate Base and Subbase Courses.

END OF SECTION

SECTION 31 23 23.15
TRENCH BACKFILL

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Public Works Association (APWA): Uniform Color Code.
 2. ASTM International (ASTM):
 - a. C33/C33M, Standard Specification for Concrete Aggregates.
 - b. C94/C94M, Standard Specification for Ready-Mixed Concrete.
 - c. C117, Standard Test Method for Materials Finer than 75 Micrometer (No. 200) Sieve in Mineral Aggregates by Washing.
 - d. C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - e. C150/C150M, Standard Specification for Portland Cement.
 - f. C618, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
 - g. C1012/C1012M, Standard Test Method for Length Change of Hydraulic-Cement Mortars Exposed to a Sulfate Solution.
 - h. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - i. D1140, Standard Test Methods for Amount of Material in Soils Finer than No. 200 (75 micrometer) Sieve.
 - j. D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 - k. D2487, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
 - l. D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
 - m. D4254, Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
 - n. D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
 - o. D4832, Standard Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders.
 3. National Electrical Manufacturers Association (NEMA): Z535.1, Safety Colors.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

1.02 DEFINITIONS

- A. Base Rock: Granular material upon which manhole bases and other structures are placed.
- B. Bedding Material: Granular material upon which pipes, conduits, cables, or duct banks are placed.
- C. Imported Material: Material obtained by Contractor from source(s) offsite.
- D. Lift: Loose (uncompacted) layer of material.
- E. Pipe Zone: Backfill zone that includes full trench width and extends from prepared trench bottom to an upper limit above top outside surface of pipe, conduit, cable or duct bank.
- F. Prepared Trench Bottom: Graded trench bottom after excavation and installation of stabilization material, if required, but before installation of bedding material.
- G. Relative Compaction: The ratio, in percent, of the as-compacted field dry density to the laboratory maximum dry density as determined by ASTM D1557. Corrections for oversize material may be applied to either as-compacted field dry density or maximum dry density, as determined by Construction Manager.
- H. Relative Density: As defined by ASTM D4253 and ASTM D4254.
- I. Selected Backfill Material: Material available onsite that Construction Manager determines to be suitable for a specific use.
- J. Well-Graded: A mixture of particle sizes that has no specific concentration or lack thereof of one or more sizes producing a material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids. Satisfying both of the following requirements, as defined in ASTM D2487:
 - 1. Coefficient of Curvature: Greater than or equal to 1 and less than or equal to 3.
 - 2. Coefficient of Uniformity: Greater than or equal to 4 for materials classified as gravel, and greater than or equal to 6 for materials classified as sand.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

1.03 SUBMITTALS

A. Action Submittals:

1. Shop Drawings: Manufacturer's descriptive literature for marking tapes.
2. Samples:
 - a. Trench stabilization material.
 - b. Bedding and pipe zone material.
 - c. Granular drain.
 - d. Granular backfill.
 - e. Earth backfill.
 - f. Sand(s).
 - g. Tracer Wire.

B. Informational Submittals:

1. Catalog and manufacturer's data sheets for compaction equipment.
2. Certified Gradation Analysis: Submit not less than 30 days prior to delivery for imported materials or anticipated use for excavated materials, except for trench stabilization material that will be submitted prior to material delivery to Site.
3. Controlled Low Strength Material: Certified mix design and test results. Include material types and weight per cubic yard for each component of mix.

PART 2 PRODUCTS

2.01 MARKING TAPE

A. Nondetectable:

1. Inert polyethylene, impervious to known alkalis, acids, chemical reagents, and solvents likely to be encountered in soil.
2. Thickness: Minimum 5 mils.
3. Width: 3 inches.
4. Identifying Lettering: Minimum 1-inch high, permanent black lettering imprinted continuously over entire length.
5. Manufacturers and Products:
 - a. Reef Industries; Terra Tape.
 - b. Mutual Industries; Non-detectable Tape.
 - c. Presco; Non-detectable Tape.

JACKSONVILLE PORT AUTHORITY
 BLOUNT ISLAND EQUIPMENT WASH FACILITY

B. Detectable:

1. Solid aluminum foil, visible on unprinted side, encased in protective high visibility, inert polyethylene plastic jacket.
2. Foil Thickness: Minimum 0.35 mils.
3. Laminate Thickness: Minimum 5 mils.
4. Width: 3 inches.
5. Identifying Lettering: Minimum 1-inch high, permanent black lettering imprinted continuously over entire length.
6. Joining Clips: Tin or nickel-coated furnished by tape manufacturer.
7. Manufacturers and Products:
 - a. Reef Industries; Terra Tape, Sentry Line Detectable.
 - b. Mutual Industries; Detectable Tape.
 - c. Presco; Detectable Tape.

C. Color: In accordance with APWA Uniform Color Code.

Color*	Facility
Red	Electric power lines, cables, conduit, and lightning cables
Orange	Communicating alarm or signal lines, cables, or conduit
Yellow	Gas, oil, steam, petroleum, or gaseous materials
Green	Sewers and drain lines
Blue	Potable water
Purple	Reclaimed water, irrigation, and slurry lines
*As specified in NEMA Z535.1, Safety Color Code.	

2.02 TRACER WIRE

- A. Material: Minimum 12-gauge solid copper or copper jacket with a steel core, with high-density polyethylene (HDPE) or high-molecular weight polyethylene (HMWPE) insulation suitable for direct bury.
- B. Splices: Use wire nut or lug suitable for direct burial as recommended by tracer wire manufacturer.
- C. Manufacturers:
 1. Copperhead Industries, LLC.
 2. Performance Wire & Cable Inc.
 3. Pro-line Safety Products Company.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

2.03 TRENCH STABILIZATION MATERIAL

- A. Clean gravel or crushed rock, reasonably well-graded from coarse to fine.
- B. Maximum Particle Size: 3-inch.

2.04 BEDDING MATERIAL AND PIPE ZONE MATERIAL

- A. Unfrozen, friable, and no clay balls, roots, or other organic material.
- B. Clean or gravelly sand with less than 5 percent passing No. 200 sieve, as determined in accordance with ASTM D1140, or gravel or crushed rock within maximum particle size and other requirements as follows unless otherwise specified.
 - 1. Duct Banks: 3/4-inch maximum particle size.
 - 2. PVC Irrigation System Piping and Ductile Iron Pipe with Polyethylene Wrap: 3/8-inch maximum particle size.
 - 3. Pipe Under 18-Inch Diameter: 3/4-inch maximum particle size, except 1/4 inch for stainless steel pipe, copper pipe, tubing, and plastic pipe under 3-inch diameter.
 - 4. Pipe 18-Inch Diameter and Greater: 1-1/2-inch maximum particle size for ductile iron pipe, concrete pipe, welded steel pipe, and pretensioned or prestressed concrete cylinder pipe.
 - 5. Perforated Pipe: Granular drain material.
 - 6. Conduit and Direct-Buried Cable:
 - a. Sand, clean or clean to silty, less than 12 percent passing No. 200 sieve.
 - b. Individual Particles: Free of sharp edges.
 - c. Maximum Size Particle: Pass a No. 4 sieve.
 - d. If more than 5 percent passes No. 200 sieve, the fraction that passes No. 40 sieve shall be nonplastic as determined in accordance with ASTM D4318.

2.05 EARTH BACKFILL

- A. Earthfill, as specified in Section 31 23 23, Fill and Backfill.

2.06 PROCESSED EARTH BACKFILL

- A. Class A Backfill: Earth backfill, meeting the following additional requirement.
 - 1. Free of boulders and cobbles that would be retained on a 3-inch sieve.
 - 2. Portion retained on 3/4-inch sieve to less than 30 percent.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3. Cohesionless, free-draining material with 100 percent passing 3-inch sieve, at least 70 percent passing 1-1/2-inch sieve, and less than 15 percent passing No. 200 sieve.

2.07 CONTROLLED LOW STRENGTH MATERIAL (CLSM)

- A. Select and proportion ingredients to obtain compressive strength between 50 psi and 150 psi at 28 days in accordance with ASTM D4832.
- B. Materials:
 1. Cement: ASTM C150/C150M, Type I or Type II.
 2. Aggregate: ASTM C33/C33M, Size 7.
 3. Fly Ash (Pozzolan) or Class C fly ash in accordance with ASTM C618, except as modified herein:
 - a. ASTM C618, Table 1, Loss on Ignition: Unless permitted otherwise, maximum 3 percent.
 - b. Test in accordance with ASTM C1012/C1012M to verify sulfate resistance is acceptable.
 4. Water: Clean, potable, containing less than 500 ppm of chlorides.

2.08 CONCRETE BACKFILL

- A. Provide as specified in Section 03 30 00, Cast-in-Place Concrete.

2.09 GRAVEL SURFACING ROCK

- A. As specified in Section 32 11 23, Aggregate Base and Subbase Courses.

2.10 SOURCE QUALITY CONTROL

- A. Perform gradation analysis in accordance with ASTM C136 for:
 1. Earth backfill, including specified class.
 2. Trench stabilization material.
 3. Bedding and pipe zone material.
- B. Certify Laboratory Performance of Mix Designs:
 1. Controlled low strength material.
 2. Concrete.

PART 3 EXECUTION

3.01 TRENCH PREPARATION

- A. Water Control:
 - 1. Promptly remove and dispose of water entering trench as necessary to grade trench bottom and to compact backfill and install manholes, pipe, conduit, direct-buried cable, or duct bank. Do not place concrete, lay pipe, conduit, direct-buried cable, or duct bank in water.
 - 2. Remove water in a manner that minimizes soil erosion from trench sides and bottom.
 - 3. Provide continuous water control until trench backfill is complete.
- B. Remove foreign material and backfill contaminated with foreign material that falls into trench.

3.02 TRENCH BOTTOM

- A. Firm Subgrade: Grade with hand tools, remove loose and disturbed material, and trim off high areas and ridges left by excavating bucket teeth. Allow space for bedding material if shown or specified.
- B. Soft Subgrade: If subgrade is encountered that may require removal to prevent pipe settlement, notify Construction Manager. Construction Manager will determine depth of overexcavation, if any required.

3.03 TRENCH STABILIZATION MATERIAL INSTALLATION

- A. Rebuild trench bottom with trench stabilization material.
- B. Place material over full width of trench in 6-inch lifts to required grade, providing allowance for bedding thickness.
- C. Compact each lift so as to provide a firm, unyielding support for the bedding material prior to placing succeeding lifts.

3.04 BEDDING

- A. Furnish imported bedding material where, in the opinion of Construction Manager, excavated material is unsuitable for bedding or insufficient in quantity.
- B. Place over full width of prepared trench bottom in two equal lifts when required depth exceeds 8 inches.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- C. Hand grade and compact each lift to provide a firm, unyielding surface.
- D. Minimum Thickness:
 - 1. As follows:
 - a. Pipe 15 Inches and Smaller: 4 inches.
 - b. Pipe 18 Inches to 36 Inches: 6 inches.
 - c. Pipe 42 Inches and Larger: 8 inches.
 - d. Conduit: 3 inches.
 - e. Direct-Buried Cable: 3 inches.
 - f. Duct Banks: 3 inches.
- E. Check grade and correct irregularities in bedding material. Loosen top 1 inch to 2 inches of compacted bedding material with a rake or by other means to provide a cushion before laying each section of pipe, conduit, direct-buried cable, or duct bank.
- F. Install to form continuous and uniform support except at bell holes, if applicable, or minor disturbances resulting from removal of lifting tackle.
- G. Bell or Coupling Holes: Excavate in bedding at each joint to permit proper assembly and inspection of joint and to provide uniform bearing along barrel of pipe or conduit.

3.05 BACKFILL PIPE ZONE

- A. Upper limit of pipe zone shall not be less than following:
 - 1. Pipe: 12 inches, unless shown otherwise.
 - 2. Conduit: 3 inches, unless shown otherwise.
 - 3. Direct-Buried Cable: 3 inches, unless shown otherwise.
 - 4. Duct Bank: 3 inches, unless shown otherwise.
- B. Restrain pipe, conduit, cables, and duct banks as necessary to prevent their movement during backfill operations.
- C. Place material simultaneously in lifts on both sides of pipe and, if applicable, between pipes, conduit, cables, and duct banks installed in same trench.
 - 1. Pipe 10-Inch and Smaller Diameter: First lift less than or equal to 1/2 pipe diameter.
 - 2. Pipe Over 10-Inch Diameter: Maximum 6-inch lifts.
- D. Thoroughly tamp each lift, including area under haunches, with handheld tamping bars supplemented by “walking in” and slicing material under

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

haunches with a shovel to ensure voids are completely filled before placing each succeeding lift.

- E. Do not use power-driven impact compactors to compact pipe zone material. After full depth of pipe zone material has been placed as specified, compact material by a minimum of three passes with a vibratory plate compactor only over area between sides of pipe and trench walls. Take care to avoid damaging pipe and pipe coating.

3.06 MARKING TAPE INSTALLATION

- A. Continuously install marking tape along centerline of buried piping, at depth of 2 feet. Coordinate with piping installation drawings.
 - 1. Detectable Marking Tape: Install with nonmetallic piping and waterlines.
 - 2. Nondetectable Marking Tape: Install with metallic piping.

3.07 TRACER WIRE INSTALLATION AND TESTING

- A. Install tracer wire continuously along centerline of nonmetallic buried piping.
- B. Attach wire to top of pipe using tape at maximum of 10-foot intervals. In areas where depth of cover is excessive for allowing detection of tracer wire with electronic pipe locator, install tracer wire within pipe backfill directly above pipe centerline at a minimum depth of 3 feet.
- C. Install splices in accordance with manufacturer's instructions for direct bury applications. Tie ends of wire to be joined in a knot as required to reduce tension on splice.
- D. Bring tracer wire to surface at each valve box, curb box, vault, air valve, blowoff valve, hydrant, and pipeline marker. Tracer wire shall be brought to surface at least every 1,000 feet. If distance between pipe appurtenances exceeds 1,000 feet, install valve box to allow access to tracer wire. Coil enough excess tracer wire at each appurtenance to extend wire 12 inches above ground.
- E. Test continuity of tracer wire using electronic pipe locator in presence of Construction Manager prior to paving.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3.08 BACKFILL ABOVE PIPE ZONE

A. General:

1. Process excavated material to meet specified gradation requirements.
2. Adjust moisture content as necessary to obtain specified compaction.
3. Do not allow backfill to free fall into trench or allow heavy, sharp pieces of material to be placed as backfill until after at least 2 feet of backfill has been provided over top of pipe.
4. Do not use power driven impact type compactors for compaction until at least 4 feet of backfill is placed over top of pipe.
5. Backfill to grade with proper allowances for topsoil, crushed rock surfacing, and pavement thicknesses, wherever applicable.
6. Backfill around structures with same class backfill as specified for adjacent trench, unless otherwise shown or specified.

B. Class A Backfill:

1. Place in lifts not exceeding thickness of 9 inches.
2. Mechanically compact each lift to a minimum of 95 percent relative compaction prior to placing succeeding lifts.

C. Class C Backfill:

1. Backfill with earth backfill.
2. Leave trench with backfill material neatly mounded across the entire trench width, but not more than 6 inches above the adjacent ground surface.
3. In lawn, garden, or similar type areas, maintain trench level with the existing adjacent grade.
4. At Other Locations:
 - a. Estimate and provide amount of backfill material required so that after normal settlement, settled surface will match adjacent ground surface.
 - b. Neatly windrow material over trench, and remove excess.
 - c. Correct excess or deficiency of backfill material apparent after settlement and within correction period by regrading, and disposing of excess material or adding additional material where deficient.

D. Class D Backfill: Backfill trench above pipe zone with granular backfill in lifts not exceeding 8 inches. Compact each lift to a minimum of 95 percent relative compaction prior to placing succeeding lifts.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

E. Controlled Low Strength Material:

1. Discharge from truck mounted drum type mixer into trench.
2. Place in lifts as necessary to prevent uplift (flotation) of new and existing facilities.
3. When abandoning pipes, and removal of pipes is not directed on the Drawings, use pumps and/or tremie pipes to ensure that conduits are filled along their entire length and through their full cross-section.

3.09 REPLACEMENT OF TOPSOIL

- A. Replace topsoil in top 12 inches of backfilled trench.
- B. Maintain finished grade of topsoil even with adjacent area and grade as necessary to restore drainage.

3.10 MAINTENANCE OF TRENCH BACKFILL

- A. After each section of trench is backfilled, maintain surface of backfilled trench even with adjacent ground surface until final surface restoration is completed.
- B. Gravel Surfacing Rock: Add gravel surfacing rock where applicable and as necessary to keep surface of backfilled trench even with adjacent ground surface, and grade and compact as necessary to keep surface of backfilled trenches smooth, free from ruts and potholes, and suitable for normal traffic flow.
- C. Topsoil: Add topsoil where applicable and as necessary to maintain surface of backfilled trench level with adjacent ground surface.
- D. Concrete Pavement: Replace settled slabs as specified in Section 32 12 16, Asphalt Paving.
- E. Asphaltic Pavement: Replace settled areas or fill with asphalt as specified in Section 32 12 16, Asphalt Paving.
- F. Other Areas: Add excavated material where applicable and keep surface of backfilled trench level with adjacent ground surface.

3.11 SETTLEMENT OF BACKFILL

- A. Settlement of trench backfill, or of fill, or facilities constructed over trench backfill will be considered a result of defective compaction of trench backfill.

END OF SECTION

SECTION 32 11 23
AGGREGATE BASE AND SUBBASE COURSES

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. ASTM International (ASTM):
 - a. C29, Standard Test Method for Bulk Density (Unit Weight) and Voids in Aggregate.
 - b. C88, Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
 - c. C117, Standard Method of Test for Materials Finer Than 75 μ m (No. 200) Sieve in Mineral Aggregates by Washing.
 - d. C131, Standard Specification for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - e. C183, Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates.
 - f. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft³ (600 kN-m/m³)).
 - g. D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lb/ft³ (2700 kN-m/m³)).
 - h. D1883, Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
 - i. D2216, Standard Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.
 - j. D2419, Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
 - k. D2844, Standard Specification for Resistance R-Value and Expansion Pressure of Compacted Soils.
 - l. D4318, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
 - m. D4791, Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.
 - n. D5195, Standard Test Methods for Density of Soil and Rock In-Place Below Surface by Nuclear Methods.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- o. D6938, Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
- 2. Florida Department of Transportation (FDOT): Standard Specifications for Road and Bridge Construction, January 2024 (The Standard Specifications).

1.02 DEFINITIONS

- A. Base Course: Crushed aggregate or similar as specified placed and compacted on prepared subgrade or subbase course.
- B. Completed Course: Compacted, unyielding, free from irregularities, with smooth, tight, even surface, true to grade, line, and cross-section.
- C. Completed Lift: Compacted with uniform cross-section thickness.
- D. Gravel Surfacing: Aggregate used for construction of low-volume access and staging area that can be easily graded and compacted.
- E. Leveling Course: Crushed aggregate placed and compacted on base course to be used for finish grading.
- F. Standard Specifications: When referenced in this section, shall mean Florida Department of Transportation Standard Specifications for Road and Bridge Construction, January 2024.
- G. Subbase Course: Sandy, gravelly material placed and compacted on prepared subgrade.

1.03 SUBMITTALS

- A. Action Submittals:
 - 1. Samples: Submit for specified materials 20 days prior to delivery to Site.
- B. Informational Submittals:
 - 1. Certified Test Results on Source Materials: Submit copies from commercial testing laboratory 20 days prior to delivery of materials to Project showing materials meeting the physical qualities specified.
 - 2. Certified results of in-place density tests from independent testing agency.

PART 2 PRODUCTS

2.01 BASE COURSE

- A. As specified for Graded Aggregate Base, Group 1, in Section 204 of the FDOT Standard Specifications. Aggregate base material shall have a minimum limerock bearing ratio (LBR) of 100. Frequency of LBR testing shall be one per every 200 cubic yards of aggregate base course placed on Site.

2.02 SOURCE QUALITY CONTROL

- A. Perform tests necessary to locate acceptable source of materials meeting specified requirements.
- B. Final approval of aggregate material will be based on test results of installed materials.
- C. Should separation of coarse from fine materials occur during processing or stockpiling, immediately change methods of handling materials to correct uniformity in grading.

PART 3 EXECUTION

3.01 SUBGRADE PREPARATION

- A. As specified in Section 31 23 13, Subgrade Preparation.
- B. Obtain Construction Manager's acceptance of subgrade before placing base course or surfacing material.
- C. Do not place base course or surfacing materials in snow or on soft, muddy, or frozen subgrade.

3.02 EQUIPMENT

- A. In accordance with Section 200-3 of the FDOT Standard Specifications.
- B. Compaction Equipment: Adequate in design and number to provide compaction and to obtain specified density for each layer.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3.03 HAULING AND SPREADING

A. Hauling Materials:

1. Do not haul over surfacing in process of construction.
2. Loads: Of uniform capacity.
3. Maintain consistent gradation of material delivered; loads of widely varying gradations will be cause for rejection.

B. Spreading Materials:

1. Distribute material to provide required density, depth, grade, and dimensions with allowance for subsequent lifts.
2. Produce even distribution of material upon roadway or prepared surface without segregation.
3. Should segregation of coarse from fine materials occur during placing, immediately change methods of handling materials to correct uniformity in grading.

3.04 CONSTRUCTION OF COURSES

A. Construction of Courses: In accordance with Section 200-5, of the FDOT Standard Specifications, except as modified hereinafter.

B. Base Course:

1. Maximum Completed Lift Thickness: 6 inches. If the design thickness of the base course is more than 6-inches, it shall be constructed in two or more courses of approximately equal thickness.
2. Completed Course Total Thickness: As shown on the Drawings.
3. Spread lift on preceding course to required cross-section.
4. Lightly blade and roll surface until thoroughly compacted.
5. Add keystone to achieve compaction and as required when aggregate does not compact readily because of lack of fines or natural cementing properties, as follows:
 - a. Use leveling course or surfacing material as keystone.
 - b. Spread evenly on top of base course, using spreader boxes or chip spreaders.
 - c. Roll surface until keystone is worked into interstices of base course without excessive displacement.
 - d. Continue operation until course has become thoroughly keyed, compacted, and will not creep or move under roller.
6. Blade or broom surface to maintain true line, grade, and cross-section.

3.05 ROLLING AND COMPACTION

- A. In accordance with Section 200-6 of the FDOT Standard Specifications, except as modified hereinafter:
1. Commence compaction of each layer of base after spreading operations and continue until density of 100 percent of maximum density has been achieved as determined by ASTM D1557.
 2. Roll each layer of material until material does not creep under roller before succeeding layer is applied.
 3. Commence rolling at outer edges and continue toward center; do not roll center of road first.
 4. Apply water as needed to obtain specified densities.
 5. Place and compact each lift to the required density before succeeding lift is placed.
 6. Surface Defects: Remedy by loosening and rerolling. Reroll entire area, including surrounding surface, until thoroughly compacted.
 7. Finished surface shall be true to grade and crown before proceeding with surfacing.

3.06 SURFACE TOLERANCES

- A. Blade or otherwise work surfacing as necessary to maintain grade and cross-section at all times, and to keep surface smooth and thoroughly compacted.
- B. Finished Surface of Untreated Aggregate Base Course: Within plus or minus 0.04 foot of grade shown at any individual point.
- C. Overall Average: Within plus or minus 0.01 foot from crown and grade specified.

3.07 FIELD QUALITY CONTROL

- A. In-Place Density Tests:
1. Provide testing laboratory and Construction Manager at least 2 hours advance notification prior to testing.
 2. Show proof that areas meet specified requirements before requesting that Construction Manager identify density test locations.

JACKSONVILLE PORT AUTHORITY
 BLOUNT ISLAND EQUIPMENT WASH FACILITY

3. Refer to Table 2 for minimum sampling and testing requirements for aggregate base course and surfacing.

Table 2 Minimum Sampling and Testing Requirements			
Property	Test Method	Frequency	Sampling Point
Gradation	ASTM C117 and ASTM C183	One sample every 500 tons but at least every 4 hours of production	Roadbed after processing
Moisture Density (Maximum Density)	ASTM D1557, Method D	One test for every aggregate grading produced	Production output or stockpile
In-Place Density and Moisture Content	ASTM D5195, ASTM D6938, and ASTM D2216 for moisture content	One for each 500 ton but at least every 10,000 sq ft of area	In-place completed, compacted area

3.08 CLEANING

- A. Remove excess material from the Work area. Clean stockpile and staging areas of all excess aggregate.

END OF SECTION

**SECTION 32 12 16
ASPHALT PAVING**

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Association of State Highway and Transportation Officials (AASHTO):
 - a. M17, Standard Specification for Mineral Filler for Bituminous Paving Mixtures.
 - b. M81, Standard Specification for Cut-Back Asphalt (Rapid Curing Type).
 - c. M82, Standard Specification for Cut-Back Asphalt (Medium Curing Type).
 - d. M140, Standard Specification for Emulsified Asphalt.
 - e. M156, Standard Specification for Requirements for Mixing Plants for Hot-mixed, Hot-laid Bituminous Paving Mixes.
 - f. M208, Standard Specification for Cationic Emulsified Asphalt.
 - g. R35, Standard Practice for Superpave Volumetric Design for Hot Mix Asphalt.
 - h. T166, Standard Method of Test for Bulk Specific Gravity (Gmb) of Compacted Hot Mix Asphalt (HMA) Mixtures Using Saturated Surface-Dry Specimens.
 - i. T176, Standard Method of Test for Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test.
 - j. T209, Standard Method of Test for Theoretical Maximum Specific Gravity (Gmm) and Density of Hot Mix Asphalt (HMA).
 - k. T247, Standard Method of Test for Preparation of Test Specimens of Hot Mix Asphalt (HMA) by Means of California Kneading Compactor.
 - l. T283, Standard Method of Test for Resistance of Compacted Hot Mix Asphalt (HMA) to Moisture-Induced Damage.
 - m. T304, Standard Method of Test for Uncompacted Void Content of Fine Aggregate.
 - n. T312, Standard Method of Test for Preparing and Determining the Density of Hot Mix Asphalt (HMA) Specimens by Means of a Superpave Gyratory Compactor.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

2. Asphalt Institute (AI):
 - a. Manual Series No. 2 (MS-2), Mix Design Methods for Asphalt Concrete.
 - b. Superpave Series No. 2 (SP-2), Superpave Mix Design.
3. ASTM International (ASTM):
 - a. C150/C150M, Standard Specification for Portland Cement.
 - b. C618, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
 - c. D75, Standard Method of Test for Sampling of Aggregates.
 - d. D140, Standard Method of Test for Sampling Bituminous Materials.
 - e. D979, Standard Method of Test for Sampling Bituminous Paving Mixtures.
 - f. D2041, Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures.
 - g. D2489, Standard Method of Test for Determining Degree of Particle Coating of Asphalt Mixtures.
 - h. D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
 - i. D4791, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.
 - j. D5821, Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate.
 - k. E329 REV A, Standard Specification for Agencies Engaged in Construction Inspection Testing, or Special Inspection.
4. Florida Department of Transportation: Standard Specifications for Road and Bridge Construction, July 2024.
5. Unified Facilities Guide Specifications: UFGS-32 12 19.16 Resin Modified Surfacing Material, November 2019.

1.02 DEFINITIONS

- A. Combined Aggregate: All mineral constituents of asphalt concrete mix, including mineral filler and separately sized aggregates.
- B. Macadam: A mixture of soil aggregate and coarse aggregate.
- C. Maximum Aggregate Size: One sieve size larger than the nominal aggregate size.
- D. Nominal Aggregate Size: One sieve size larger than the first sieve that retains more than 10 percent aggregate.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- E. Prime Coat: Low viscosity cutback or emulsified asphalt applied to granular base in preparation of paving to coat and bond loose materials, harden the surface, plug voids, prevent moisture migration, and provide adhesion.
- F. Reclaimed asphalt pavement (RAP): Removed and/or processed pavement materials containing binder and aggregate.
- G. Resin Modified Pavement: Pavement modified with epoxy resin and epoxy grout applied to an open graded asphalt mix.
- H. Seal Coat: Term used for various applications of emulsified asphalt, with or without sand or aggregate, to protect the asphalt surface from aging due to wear, degradation from the sun, wind, and water. Also used to improve skid resistance and aesthetics. The term seal coat can be used to define fog seal, slurry seal, chip seal or sand seal, depending on application.
- I. Standard Specifications: When referenced in this section, shall mean Florida Department of Transportation Standard Specifications for Road and Bridge Construction, January 2024.
- J. Tack Coat: Thin layer of emulsified asphalt applied to hard surfaces, including new pavement lifts, to promote adhesion and bonding.

1.03 DESIGN REQUIREMENTS

- A. Prepare asphalt concrete mix design, meeting the following design criteria, tolerances, and other requirements of this specification.
- B. Design Criteria:
 - 1. Superpave Method, AI SP-2, AASHTO R35:
 - a. Design Gyration, N_{DES} : 125 average for PG 76M and 100 average for PG67.
 - b. Coarse Aggregate Angularity, ASTM D5821: One or more fractured faces 95 percent minimum; two or more fractured faces 90 percent, minimum.
 - c. Fine Aggregate Angularity, AASHTO T304: 45 percent below 4 inches (100 mm) from surface and 45 percent above 4 inches (100 mm) from surface. 45 percent for natural sand.
 - d. Flat and Elongated Particles, ASTM D4791: 8 percent, maximum.
 - e. Clay Content, AASHTO T176: Minimum sand equivalent of 45 percent.
 - f. Voids in Mineral Aggregate: See Table 1.
 - g. Voids Filled with Asphalt: 70 percent to 80 percent.

JACKSONVILLE PORT AUTHORITY
 BLOUNT ISLAND EQUIPMENT WASH FACILITY

- h. Mixture Density as a Percentage of Theoretical Maximum Density at Initial Gyration Level: 89 percent, maximum.
- i. Mix Density at Maximum Number of Gyration: Less than 98 percent of theoretical maximum density.
- j. Dust Proportion: 0.8 to 1.6.
- k. Air Voids: 4 percent.
- l. Tensile Strength Ratio, AASHTO T283: 80 percent, minimum.

Table 1	
Voids in Mineral Aggregate (VMA) Criteria	
Nominal Maximum Aggregate Size (mm)	Minimum VMA, Percent
1/2" (12.5)	14
3/4" (19.0)	13
1-1/2" (37.5)	11

C. Furnished Mix Tolerances:

- 1. Conform to asphalt concrete mix formula within the following, plus or minus:
 - a. Aggregate Passing No. 4 (4.76 mm) and Larger Sieves: 5 percent.
 - b. Aggregate Passing the No. 8 (2.38 mm) to No. 100 (150 µm) Sieves: 4 percent.
 - c. Aggregate Passing the No. 200 (75 µm) Sieve: 2 percent.
 - d. Bitumen Content: 0.3 percent of volume or batch weight of aggregate.
 - e. Temperature Leaving Mixer: Plus or minus 20 degrees F (11 degrees C).
 - f. Temperature in Paving Machine Hopper: Plus or minus 20 degrees F (11 degrees C).

1.04 SUBMITTALS

A. Informational Submittals:

- 1. Asphalt Concrete Mix Formula:
 - a. Submit minimum of 15 days prior to start of production.
 - b. Submittal to include the following information:
 - 1) Gradation and portion for each aggregate constituent used in mixture to produce a single gradation of aggregate within specified limits.
 - 2) Bulk specific gravity for each aggregate constituent.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- 3) Measured maximum specific gravity of mix at optimum asphalt content determined in accordance with ASTM D2041.
 - 4) Properties as stated in this section for at least four different asphalt contents other than optimum, two below optimum, and two above optimum.
 - 5) Percent of asphalt lost due to absorption by aggregate.
 - 6) Index of Retained Strength (TSR) at optimum asphalt content as determined by AASHTO T283.
 - 7) Percentage of asphalt cement, to nearest 0.1 percent, to be added to mixture.
 - 8) Optimum mixing temperature.
 - 9) Optimum compaction temperature.
 - 10) Temperature-viscosity curve of asphalt cement to be used.
 - 11) Brand name of any additive to be used and percentage added to mixture.
2. Resin Modified Pavement Mix:
- a. Submit minimum of 15 days prior to start of production.
 - b. Submittal to include the following information:
 - 1) Gradation and portion for each aggregate constituent used in mixture to produce a single gradation of aggregate within specified limits.
 - 2) Bulk specific gravity for each aggregate constituent.
 - 3) Measured maximum specific gravity of mix at optimum asphalt content determined in accordance with ASTM D2041.
 - 4) Properties as stated in this section for at least four different asphalt contents other than optimum, two below optimum, and two above optimum.
 - 5) Percent of asphalt lost due to absorption by aggregate.
 - 6) Index of Retained Strength (TSR) at optimum asphalt content as determined by AASHTO T283.
 - 7) Percentage of asphalt cement, to nearest 0.1 percent, to be added to mixture.
 - 8) Optimum mixing temperature.
 - 9) Optimum compaction temperature.
 - 10) Temperature-viscosity curve of asphalt cement to be used.
 - 11) Brand name of any additive to be used and percentage added to mixture.
 - 12) Cement used in the slurry.
 - 13) Fly ash.
 - 14) Sand for slurry grout.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3. Test Report for Asphalt Cement:
 - a. Submit minimum 10 days prior to start of production.
 - b. Show appropriate test method(s) for each material and the test results.
4. Manufacturer's Certificate of Compliance, in accordance with Section 01 61 00, Common Product Requirements, for the following materials:
 - a. Aggregate: Gradation, source test results as defined in the Standard Specifications.
 - b. Asphalt for Binder: Type, grade, and viscosity-temperature curve.
 - c. Prime Coat: Type and grade of asphalt.
 - d. Tack Coat: Type and grade of asphalt.
 - e. Additives.
 - f. Mix: Conforms to job-mix formula.
 - g. Polymer resin.
 - h. Slurry grout.
 - i. Cement.
 - j. Curing compound.
5. Statement of qualification for independent testing laboratory.
6. Test Results:
 - a. Mix design.
 - b. Asphalt concrete core.
 - c. Gradation and asphalt content of uncompacted mix.
 - d. Field density.
7. Quality control.
8. Experience of Resin Modified Pavement:
 - a. Ten years of experience in resin modified pavement manufacturing and placement.
 - b. Five successful port/airport applications within the last 5 years.

1.05 QUALITY ASSURANCE

A. Qualifications:

1. Independent Testing Laboratory: In accordance with ASTM E329 REV A.
2. Asphalt concrete mix formula shall be prepared by approved certified independent laboratory under the supervision of a certified asphalt technician.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- B. Compaction Control Strip:
1. General:
 - a. Construct to approximately 400 square yards in area and at location that will become a portion of completed paved area.
 - b. Thickness: Typical of thickness to be paved on Project.
 2. Rollers Used for Compaction:
 - a. Steel Wheel Rollers: Minimum static weight 10 tons (9 mg).
 - b. Pneumatic Rollers: Capable of exerting pressure of 80 psi (550 kPa) on bituminous surface.
 - c. Vibratory Rollers: Static weight minimum 6 tons (5.5 mg), capable of applying a 10-ton (9-mg) impact force equipped with amplitude and frequency control specifically designed for compaction of bituminous mixtures.
 3. Compaction:
 - a. Compact bituminous mat, using a standard rolling pattern that covers entire control strip. Request that independent testing laboratory performs final density test.
 - b. Continue rolling until no further compaction can be obtained as determined by field density testing.
 - c. Temperature and condition of bituminous mat shall be considered workable when further compaction can no longer be obtained.
 4. Target Density Determination:
 - a. Select test point near center of normal roller pass, but no closer than 2 feet (600 mm) from edge of mat and 50 feet (15 m) from either end of control strip. Mat thickness at this point shall be at least depth of finished pavement.
 - b. Point at which no further densification can be obtained.
 5. Establish new target density if change is made in mix design, nominal depth of mat being placed, aggregate source, or material properties.

1.06 ENVIRONMENTAL REQUIREMENTS

- A. Temperature: Do not apply asphalt materials or place asphalt mixes when ground temperature is lower than 50 degrees F (10 degrees C) or air temperature is lower than 40 degrees F (4 degrees C). Measure ground and air temperature in shaded areas away from heat sources or wet surfaces.
- B. Moisture: Do not apply asphalt materials or place asphalt mixes when application surface is wet.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Tack Coat: Emulsified Asphalt for Tack Coat or Seal Coat: Conform to Section 300, Prime and Tack Coats of the Standard Specifications.

2.02 ASPHALT CONCRETE MIX

- A. General:
 - 1. Refer to Article Design Requirements.
 - 2. Mix formula shall not be modified except with written approval of Construction Manager.
 - 3. Source Changes:
 - a. Should material source(s) change, establish new asphalt concrete mix formula before new material(s) is used.
 - b. Perform check tests of properties of plant-mix bituminous materials on first day of production and as requested by Construction Manager to confirm that properties are in compliance with design criteria.
 - c. Make adjustments in gradation or asphalt content as necessary to meet design criteria.
- B. Asphalt Concrete: As shown on the Drawings and as specified.
- C. Composition: Hot-plant mix of aggregate, mineral filler if required, and paving grade asphalt cement. The several aggregate fractions shall be sized, uniformly graded, and combined in such proportions that resulting mixture meets grading requirements of mix formula.
- D. Aggregate:
 - 1. As specified in the Standard Specifications. RAP material may be used up to a maximum of 15 percent by total weight for PG 67-22 binder and 20 percent by total weight for PG 76-22 binder.
 - 2. Coarse: In accordance with Section 901, Coarse Aggregate of the FDOT Standard Specifications.
 - a. Material retained on a No. 8 (2.36-mm) sieve.
 - b. Minimum 90 percent by weight of individual pieces having two or more fractured faces, and 95 percent by weight having at least one fractured face.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3. Fine: In accordance with Section 902, Fine Aggregate of the FDOT Standard Specifications.
 - a. Material passing a No. 8 (2.36-mm) sieve.
 - b. Clean, sound, durable, angular shaped particles produced by crushing.
 - c. Plasticity Index: Maximum 6.
 - d. Liquid Limit: Maximum 25, when tested in accordance with ASTM D4318.
 4. Natural Sand:
 - a. Comply with Fine Aggregate Angularity, AASHTO T304: 45 percent or above.
- E. Asphalt Cement: Grade as shown and as specified in Section 916, Bituminous Materials of the Standard Specifications.

2.03 RESIN MODIFIED PAVEMENT MIX

- A. General:
1. Mix formula shall not be modified except with written approval of Construction Manager.
 2. Source Changes:
 - a. Should material source(s) change, establish new asphalt concrete mix formula before new material(s) is used.
 - b. Perform check tests of properties of plant-mix bituminous materials on first day of production and as requested by Construction Manager to confirm that properties are in compliance with design criteria.
 - c. Make adjustments in gradation or asphalt content as necessary to meet design criteria.
- B. Asphalt Concrete: The asphalt mix shall be an open graded mix as specified in Paragraph 2.7 of the UFGS-32 12 19.16 Resin Modified Surfacing Material, November 2019. The mix shall be approved by the resin manufacturer's representative
- C. Portland Cement: Unless otherwise specified, conform to requirements of ASTM C150/C150M.
- D. Filler: Fly ash shall have at least 95 percent by weight of material passing the 0.075 mm sieve (No. 200). Fly ash must conform to ASTM C618, Class F.
1. Shall not be produced from process that has utilized hazardous or potentially hazardous materials.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

2. ASTM C618, Table 1, Loss on Ignition: Unless permitted otherwise, maximum 3 percent.
- E. Cross Polymer Resin: The cross polymer resin shall be Prosalvia L7 as manufactured/distributed by Alyan Corporation, or approved equal. The use of resin shall comply with manufacturer's recommendations and instructions. The detailed methodology of incorporating resin into the asphalt mix shall comply with Unified Facilities Guide Specifications: UFGS-32 12 19.16 Resin Modified Surfacing Material, November 2019.
- F. Composition: Hot-plant mix of aggregate, mineral filler if required, and paving grade asphalt cement. The several aggregate fractions shall be sized, uniformly graded, and combined in such proportions that resulting mixture meets grading requirements of mix formula.
- G. Aggregate:
1. As specified in the FDOT Standard Specifications. RAP material may not be used.
 2. Coarse: In accordance with Section 901, Coarse Aggregate of the Standard Specifications.
 - a. Material retained on a No. 8 (2.36 mm) sieve.
 - b. Minimum 90 percent by weight of individual pieces having two or more fractured faces, and 95 percent by weight having at least one fractured face.
 3. Fine: In accordance with Section 902, Fine Aggregate of the Standard Specifications.
 - a. Material passing a No. 8 (2.36 mm) sieve.
 - b. Clean, sound, durable, angular shaped particles produced by crushing.
 - c. Plasticity Index: Maximum 6.
 - d. Liquid Limit: Maximum 25, when tested in accordance with ASTM D4318.
 4. Natural Sand: Shall comply with Fine Aggregate Angularity, AASHTO T304: 45 percent or above.
- H. Asphalt Cement: Grade as shown and as specified in Section 916, Bituminous Materials of the Standard Specifications.

PART 3 EXECUTION

3.01 LINE AND GRADE

- A. Provide and maintain intermediate control of line and grade, independent of underlying base, to meet finish surface grades and minimum thickness.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

3.02 APPLICATION EQUIPMENT

- A. In accordance with Section 330, Hot Mix Asphalt – General Construction Requirements of the Standard Specifications.

3.03 PREPARATION

- A. Prepare subgrade as specified in Section 31 23 13, Subgrade Preparation.
- B. Existing Terminal:
 - 1. Modify profile by grinding, milling, or overlay methods as approved, to provide meet lines and surfaces and to produce smooth riding connection to existing facility.
 - 2. Remove existing material to a minimum depth of 1 inch (25 mm).
 - 3. Paint edges of meet line with tack coat prior to placing new pavement.
- C. Thoroughly coat edges of contact surfaces (curbs, manhole frames) with emulsified asphalt or asphalt cement prior to laying new pavement. Prevent staining of adjacent surfaces.

3.04 PAVEMENT APPLICATION

- A. General: Place asphalt concrete mixture on approved, prepared base in conformance with this section.
- B. Prime Coat:
 - 1. Apply uniformly to clean, dry surfaces avoiding overlapping of applications.
 - 2. Do not apply when moisture content of upper 3 inches (75 mm) of base exceeds optimum moisture content of base, or if free moisture is present.
 - 3. Application Rate: 0.15 gallon to 0.50 gallon per square yard (70 liters to 2.28 liters per square meter) of surface area. Construction Manager will determine amount to be applied within range specified.
 - 4. Remove or redistribute excess material.
 - 5. Allow a minimum of 5 full days for curing of primed surface before placing asphalt concrete.
- C. Tack Coat:
 - 1. Prepare material, as specified in Section 300, Prime and Tack Coats of the Standard Specifications, prior to application.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

2. Apply uniformly to clean, dry surfaces avoiding overlapping of applications.
3. Do not apply more tack coat than necessary for the day's paving operation.
4. Touch up missed or lightly coated surfaces and remove excess material.
5. Application Rate:
 - a. 0.05 gallon per square yard to 0.15 gallon per square yard (0.25 liter per square meter to 0.70 liter per square meter) of asphalt (residual if diluted emulsified asphalt).
 - b. Apply at rate, within range specified, sufficient to assure good bonding, but not so heavy that surplus asphalt flushes into asphalt concrete being placed.

D. Pavement Mix:

1. Prior to Paving:
 - a. Sweep primed surface free of dirt, dust, or other foreign matter.
 - b. Patch holes in primed surface with asphalt concrete pavement mix.
 - c. Blot excess prime material with sand.
2. Place asphalt concrete pavement mix in two equal lifts.
3. Compacted Lift Thickness:
 - a. Minimum: Twice maximum aggregate size, but in no case less than 1 inch (25 mm).
 - b. Maximum: 4 inches (100 mm).
4. Total Compacted Thickness: As shown on construction Standard Details.
5. Sequence placement so that meet lines are straight and edges are vertical.
6. Collect and dispose of segregated aggregate from raking process. Do not scatter material over finished surface.
7. Joints:
 - a. Offset edge of each layer a minimum of 6 inches (150 mm) so joints are not directly over those in underlying layer.
 - b. Offset longitudinal joints in roadway pavements so longitudinal joints in wearing layer coincide with pavement centerlines and lane divider lines.
 - c. Form transverse joints by cutting back on previous day's run to expose full vertical depth of layer.
8. Succeeding Lifts: Apply tack coat to pavement surface between each lift.
9. After placement of pavement, seal meet line by painting a minimum of 6 inches (150 mm) on each side of joint with cutback or emulsified asphalt. Cover immediately with sand.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

E. Compaction:

1. Roll until roller marks are eliminated and minimum density of 97 percent of mix design unit weight at optimum asphalt content is obtained.
2. Joint Compaction:
 - a. Place top or wearing layer as continuously as possible.
 - b. Pass roller over unprotected end of freshly laid mixture only when placing of mix is discontinued long enough to permit mixture to become chilled.
 - c. Cut back previously compacted mixture when Work is resumed to produce slightly beveled edge for full thickness of layer.
 - d. Cut away waste material and lay new mix against fresh cut.

F. Tolerances:

1. General: Conduct measurements for conformity with crown and grade immediately after initial compression. Correct variations immediately by removal or addition of materials and by continuous rolling.
2. Completed Surface or Wearing Layer Smoothness:
 - a. Uniform texture, smooth, and uniform to crown and grade.
 - b. Maximum Deviation: 1/8 inch (3 mm) from lower edge of a 12-foot (3.6-m) straightedge, measured continuously parallel and at right angle to centerline.
 - c. If surface of completed pavement deviates by more than twice specified tolerances, remove and replace wearing surface.
3. Transverse Slope Maximum Deviation: 1/4 inch (6 mm) in 12 feet (3.6 m) from rate of slope shown.
4. Finished Grade:
 - a. Perform field differential level survey on maximum 50-foot (15-m) grid and along grade breaks.
 - b. Maximum Deviation: 0.02 foot (6 mm) from grade shown.

G. Seal Coat:

1. General: Apply seal coat of paving grade or emulsified asphalt to finished surface at longitudinal and transverse joints, joints at abutting pavements, areas where asphalt concrete was placed by hand, patched surfaces, and other areas as directed by Construction Manager .
2. Preparation:
 - a. Surfaces that are to be sealed shall be maintained free of holes, dry, and clean of dust and loose material.
 - b. Seal in dry weather and when temperature is above 35 degrees F (2 degrees C).

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

3. Application:
 - a. Fill cracks over 1/16 inch (1.5 mm) in width with asphalt-sand slurry or approved crack sealer prior to sealing.
 - b. When sealing patched surfaces and joints with existing pavements, extend minimum 6 inches (150 mm) beyond edges of patches.

3.05 RESIN MODIFIED PAVEMENT

- A. General: Place asphalt concrete mixture on approved, prepared base in conformance with this Section.
- B. Prime Coat:
 1. Apply uniformly to clean, dry surfaces avoiding overlapping of applications.
 2. Do not apply when moisture content of upper 3 inches (75 mm) of base exceeds optimum moisture content of base, or if free moisture is present.
 3. Application Rate: 0.15 gallon to 0.50 gallon per square yard (70 liters to 2.28 liters per square meter) of surface area. Construction Manager will determine amount to be applied within range specified.
 4. Remove or redistribute excess material.
 5. Allow a minimum of 5 full days for curing of primed surface before placing asphalt concrete.
- C. Tack Coat:
 1. Prepare material, as specified in Section 300, Prime and Tack Coats of the Standard Specifications, prior to application.
 2. Apply uniformly to clean, dry surfaces avoiding overlapping of applications.
 3. Do not apply more tack coat than necessary for the day's paving operation.
 4. Touch up missed or lightly coated surfaces and remove excess material.
 5. Application Rate:
 - a. 0.05 gallon per square yard to 0.15 gallon per square yard (0.25 liter per square meter to 0.70 liter per square meter) of asphalt (residual if diluted emulsified asphalt).
 - b. Apply at rate, within range specified, sufficient to assure good bonding, but not so heavy that surplus asphalt flushes into asphalt concrete being placed.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

D. Pavement Mix:

1. Prior to Paving:
 - a. Sweep primed surface free of dirt, dust, or other foreign matter.
 - b. Patch holes in primed surface with asphalt concrete pavement mix.
 - c. Blot excess prime material with sand.
2. Place asphalt concrete pavement mix for modified resin pavement in two equal lifts of 2 inches each.
3. Compacted Lift Thickness:
 - a. Minimum: Twice maximum aggregate size, but in no case less than 2 inches (50 mm).
 - b. Maximum: 2 inches (50 mm).
4. Total Compacted Thickness: As shown on the Drawings.
5. Sequence placement so that meet lines are straight and edges are vertical.
6. Collect and dispose of segregated aggregate from raking process. Do not scatter material over finished surface.
7. Joints:
 - a. Offset edge of each layer a minimum of 6 inches (150 mm) so joints are not directly over those in underlying layer.
 - b. Offset longitudinal joints in roadway pavements so longitudinal joints in wearing layer coincide with pavement centerlines and lane divider lines.
 - c. Form transverse joints by cutting back on previous day's run to expose full vertical depth of layer.
8. Succeeding Lifts: Apply tack coat to pavement surface between each lift.
9. After placement of pavement, seal meet line by painting a minimum of 6 inches (150 mm) on each side of joint with cutback or emulsified asphalt. Cover immediately with sand.

E. Compaction: Small (1.8 to 2.0 metric ton) tandem steel wheel vibratory rollers shall be used to smooth over the surface of freshly placed open graded bituminous mixture. The vibratory unit shall be turned off during smoothing of the bituminous mixture. The open graded mixture shall be smoothed with one to three passes of the roller without vibration. The temperature of the freshly placed open graded bituminous mixture shall be low enough to prevent excessive shoving or cutting of the asphalt under the roller.

F. Protection of UngROUTED Pavement: The Contractor shall protect the ungrouted pavement from traffic and against contamination from mud, dirt, wind-blown debris, waterborne material, or any other contamination which could enter the void spaces of the open graded bituminous mixture before grout applications.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

Protective materials shall consist of rolled polyethylene sheeting. The sheeting may be mounted on either the paver or a separate movable bridge from which it can be unrolled without dragging over the pavement surface.

- G. Preparation of Slurry Grout: The slurry grout shall be mixed using a batch plant, portable mixer and/or ready-mix truck in accordance with the approved mixture. When using ready-mix trucks for transporting slurry grout, the grout mixture shall be thoroughly mixed at the Job Site immediately before application for a minimum of 10 minutes. Thorough mixing shall be accomplished by rotating the mixing drum at the maximum allowable revolutions per minute.
- H. Placing Slurry Grout:
 - 1. Temperature of the bituminous mixture shall be less than 100 degrees F before applying grout. The slurry grout shall be spread over the bituminous mixture using a spreader or squeegee. The application of the slurry grout shall be sufficient to fill the internal voids of the open graded bituminous mixture. The grouting operation shall begin at the low side to the high side. The direction of the grouting operation shall be the same as used to pave the open graded mixture. The small tandem steel wheel roller in vibratory mode shall be passed over the grout covered bituminous mixture to promote full penetration of the slurry grout into the void spaces.
 - 2. Wearing Layer Smoothness:
 - a. Uniform texture, smooth, and uniform to crown and grade.
 - b. Maximum Deviation: 1/8 inch (3 mm) from lower edge of a 12-foot (3.6-m) straightedge, measured continuously parallel and at right angle to centerline.
 - c. If surface of completed pavement deviates by more than twice specified tolerances, remove and replace wearing surface.
 - 3. Transverse Slope Maximum Deviation: 1/4 inch (6 mm) in 12 feet (3.6 m) from rate of slope shown.
 - 4. Finished Grade:
 - a. Perform field differential level survey on maximum 50-foot (15-m) grid and along grade breaks.
 - b. Maximum Deviation: 0.02 foot (6 mm) from grade shown.
- I. Curing:
 - 1. Bottom 2-inch layer of resin modified asphalt shall be allowed to cure for 5 days before top 2-inch layer is placed.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

2. Top 2-inch layer shall be allowed to cure for 14 days before access or loading is permitted.
3. Use membrane forming curing compound with white pigmented compounds conforming to ASTM C309.

3.06 PAVEMENT OVERLAY

A. Preparation:

1. Remove fatty asphalt, grease drippings, dust, and other deleterious matter.
2. Surface Depressions: Fill with asphalt concrete mix, and thoroughly compact.
3. Damaged Areas: Remove broken or deteriorated asphalt concrete and patch as specified in Article Patching.
4. Portland Cement Concrete Joints: Remove joint filler to minimum 1/2 inch (12 mm) below surface.

B. Application:

1. Tack Coat: As specified in this section.
2. Place and compact asphalt concrete as specified in Article Pavement Application.
3. Place first layer to include widening of pavement and leveling of irregularities in surface of existing pavement.
4. When leveling irregular surfaces and raising low areas, the actual compacted thickness of any one lift shall not exceed 2 inches (50 mm).
5. Actual compacted thickness of intermittent areas of 120 square yards (100 square meters) or less may exceed 2 inches (50 mm), but not 4 inches (100 mm).
6. Final wearing layer shall be of uniform thickness, and meet grade and cross-section as shown.

3.07 PATCHING

A. Preparation:

1. Remove damaged, broken, or unsound asphalt concrete adjacent to patches. Trim to straight lines exposing smooth, sound, vertical edges.
2. Prepare patch subgrade as specified in Section 31 23 13, Subgrade Preparation.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

B. Application:

1. Patch Thickness: 3 inches (75 mm) or thickness of adjacent asphalt concrete, whichever is greater.
2. Place asphalt concrete mix across full width of patch in layers of equal thickness.
3. Spread and grade asphalt concrete with hand tools or mechanical spreader, depending on size of area to be patched.

C. Compaction:

1. Roll patches with power rollers capable of providing compression of 200 pounds per linear inch to 300 pounds per linear inch (350 Newtons per linear centimeter to 525 Newtons per linear centimeter). Use hand tampers where rolling is impractical.
2. Begin rolling top course at edges of patches, lapping adjacent asphalt surface at least one-half the roller width. Progress toward center of patch overlapping each preceding track by at least one-half width of roller.
3. Make sufficient passes over entire area to remove roller marks and to produce desired finished surface.

D. Tolerances:

1. Finished surface shall be flush with and match grade, slope, and crown of adjacent surface.
2. Tolerance: Surface smoothness shall not deviate more than plus 1/4 inch (6 mm) or minus 0 inch when straightedge is laid across patched area between edges of new pavement and surface of old surfacing.

3.08 FIELD QUALITY CONTROL

A. General: Provide services of approved certified independent testing laboratory to conduct tests.

B. Field Density Tests:

1. Perform tests from cores or sawed samples in accordance with AASHTO T166.
2. Measure with properly operating and calibrated nuclear density gauge in accordance with ASTM D2950.
3. Maximum Density: In accordance with ASTM D2041, using sample of mix taken prior to compaction from same location as density test sample.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

C. Testing Frequency:

1. Quality Control Tests:
 - a. Asphalt Content, Aggregate Gradation: Once per every 500 tons (400 mg) of mix or once every 4 hours, whichever is greater.
 - b. Mix Design Properties, Measured Maximum (Rice's) Specific Gravity: Once every 1,000 tons (900 mg) or once every 8 hours, whichever is greater.
2. Density Tests: Once every 500 tons (450 mg) of mix or once every 4 hours, whichever is greater.

END OF SECTION

**SECTION 32 17 23
PAVEMENT MARKINGS**

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Association of State Highway and Transportation Officials (AASHTO):
 - a. M237, Standard Specification for Epoxy Resin Adhesives for Bonding Traffic Markers to Hardened Portland Cement and Asphalt Concrete.
 - b. M247, Standard Specification for Glass Beads Used in Traffic Paint.
 - c. M248, Standard Specification for Ready-Mixed White and Yellow Traffic Paints.
 - d. M249, Standard Specification for White and Yellow Reflective Thermoplastic Striping Material (Solid Form).
 2. Federal Specifications (FS):
 - a. A-A-2886A, Paint, Traffic, Solvent Based.
 - b. TT-B-1325C, Beads (Glass Spheres); Retroreflective.

1.02 DEFINITIONS

- A. Standard Specifications: When referenced in this section, shall mean Florida Department of Transportation Standard Specifications for Road and Bridge Construction, January 2024.

1.03 SUBMITTALS

- A. Action Submittals:
1. Shop Drawings:
 - a. Product Data:
 - 1) Thermoplastic material.
 - 2) Epoxies, resins, and primers to be used.
- B. Informational Submittals:
1. Description of proposed methods for removal of drips, overspray, improper markings, paint and thermoplastic material tracked by traffic, and existing markings.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

2. Manufacturer's Certificate of Compliance, in accordance with Section 01 61 00, Common Product Requirements, for products specified in this section.
3. Equipment List: Proposed equipment to be used, including descriptive data.
4. Manufacturer's Instructions:
 - a. Application of portland cement concrete primer.
 - b. Application of epoxy resin.

PART 2 PRODUCTS

2.01 GENERAL

- A. All products shall be in accordance with Section 711, Thermoplastic Pavement Markings of the Standard Specifications.

2.02 THERMOPLASTIC MARKING

- A. Color: White or yellow.
- B. AASHTO M249.

PART 3 EXECUTION

3.01 GENERAL

- A. Surface Preparation, Application, and Protection: In accordance with Section 711, Thermoplastic Pavement Markings of the Standard Specifications.

3.02 SURFACE PREPARATION

- A. Cleaning:
 1. Thoroughly clean surfaces to be marked before application of pavement marking material.
 2. Remove dust, dirt, and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water or a combination of these methods.
 3. Completely remove rubber deposits, surface laitance, existing paint markings, and other coatings adhering to pavement with scrapers, wire brushes, sandblasting, approved chemicals, or mechanical abrasion.
 4. Scrub areas of old pavement affected with oil or grease with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinse thoroughly after each application.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

5. Surfaces shall be completely free of dirt and ice, and dry of water at the time of application of materials specified herein.
 6. Oil-Soaked Areas: After cleaning, seal with cut shellac to prevent bleeding through the new paint.
 7. Reclean surfaces when the Work has been stopped due to rain.
 8. Existing Pavement Markings:
 - a. Remove existing pavement markings that may interfere or conflict with newly applied marking patterns, or that may result in a misleading or confusing traffic pattern.
 - b. Do not apply thermoplastic markings over existing preformed or thermoplastic markings.
 - c. Perform grinding, scraping, sandblasting or other operations so finished pavement surface is not damaged.
- B. New Concrete Pavement:
1. Allow a minimum cure time of 30 days before cleaning and marking.
 2. Clean by either sandblasting or water blasting to the following results:
 - a. No visible evidence of curing compound on peaks of textured concrete surface.
 - b. No heavy puddled deposits of curing compound in valleys of textured concrete surface.
 - c. Remaining curing compound is intact, with loose and flaking material completely removed.
 - d. Peaks of textured pavement surface are rounded in profile and free of sharp edges and irregularities.
 3. Allow a minimum drying time of 24 hours after water blasting before applying thermoplastic markings.
- C. New Asphalt Pavement: Allow a minimum pavement cure time of 30 days before applying paint.

3.03 THERMOPLASTIC MARKING APPLICATION

- A. Following specified surface preparation, prime and apply marking and glass beads to provide a reflectorized strip as shown on the Drawings.
- B. Application Temperatures:
1. Pavement Surface: Minimum 40 degrees F and rising.
 2. Thermoplastic: Minimum 375 degrees F, maximum 425 degrees F.

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

- C. Primer:
 - 1. On portland cement concrete and existing asphalt pavements, apply epoxy resin primer/sealer according to thermoplastic manufacturer's recommendations.
 - 2. All primer/sealer to dry prior to applying thermoplastic.
- D. Thermoplastic Marking:
 - 1. Extrude or spray in a molten state, free of dirt or tint at a minimum thickness of 0.125 inch; maximum thickness of 0.190 inch.
 - 2. Apply centerline, skipline, edgeline, and other longitudinal type markings with a mobile applicator.
 - 3. Apply special markings, crosswalks, stop bars, legends, arrows, and similar patterns with a portable, extrusion-type applicator.
- E. Cool completed marking to ambient temperature prior to allowing vehicular traffic.

END OF SECTION

SECTION 33 05 01.09
POLYVINYL CHLORIDE (PVC) PRESSURE PIPE AND FITTINGS

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Water Works Association (AWWA):
 - a. C110, Ductile-Iron and Gray-Iron Fittings.
 - b. C153, Ductile-Iron Compact Fittings, for Water Service.
 - c. C605, Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe and Fittings.
 - d. C900, Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 Inches Through 12 Inches (100 mm Through 300 mm), for Water Transmission and Distribution.
 - e. C905, Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 Inches through 48 Inches (350 mm through 1,200 mm) for Water Transmission and Distribution.
 - f. C907, Injection-Molded Polyvinyl Chloride (PVC) Pressure Fittings, 4 Inches through 12 Inches (100 mm Through 300 mm), for Water, Wastewater, and Reclaimed Water Service.
2. ASTM International (ASTM):
 - a. D1785, Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedule 40, 80, and 120.
 - b. D2241, Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
 - c. D2321, Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
 - d. D2466, Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
 - e. D2467, Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
 - f. D2672, Standard Specification for Joints for IPS PVC Pipe Using Solvent Cement.
 - g. D2855, Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings.
 - h. D3139, Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
3. NSF International (NSF).

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BLOUNT ISLAND EQUIPMENT WASH FACILITY

1.02 SUBMITTALS

- A. Action Submittals: Drawings showing pipe diameter, pipe class, dimension ratio (DR) and fitting details.
- B. Informational Submittals:
 - 1. Manufacturer's Certificate of Compliance.
 - 2. Hydrostatic Testing Plan:
 - a. Submit at least 15 days prior to testing and at minimum, include the following:
 - 1) Testing dates.
 - 2) Piping systems and section(s) to be tested.
 - 3) Method of isolation.
 - 4) Method of conveying water from source to system being tested.
 - 5) Method of disposing of test water.
 - 6) Calculation of maximum allowable leakage for piping section(s) to be tested.
 - 3. Certification of Calibration: Approved testing laboratory certificate if pressure gauge for hydrostatic test has been previously used. If pressure gauge is new, no certificate is required.
 - 4. Test report documentation.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Pipe: SDR 26 PVC conforming to requirements of ASTM D2241. Schedule 80 PVC conforming to requirements of ASTM D1785.
- B. Joints:
 - 1. Rubber gasketed conforming to ASTM F477.
 - 2. Joints conform to ASTM D3139.
 - 3. Lubricants as approved by Manufacturer.
- C. Fittings: Ductile Iron conforming to AWWA C153 or AWWA C110.
- D. Restrained Flange Adapter:
 - 1. Couplings shall be lined and coated with fusion-bonded epoxy in accordance with AWWA C213.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

2. Pressure Rating:
 - a. Minimum Working Pressure Rating: Not less than 150 psi.
 - b. Safety Factor: Not less than two times working pressure and shall be supported by manufacturer's proof testing.
 3. Thrust Restraint:
 - a. Provide ductile iron wedges that bear against and engage outer pipe surface and allow articulation of pipe joint after assembly while wedges remain in their original setting position on pipe surface.
 - b. Products employing set screws that bear directly on pipe will not be acceptable.
 4. Manufacturer and Product: EBAA Iron Sales Co.; Mega-Flange. Series 2100.
- E. Mechanical Joint Retainer Gland:
1. Wedge type retainer gland equal to EBAA Iron Sales, Co.; Series 2000PV.
 2. Compatible with ASTM 2241 SDR26 PVC pipe.
 3. Constructed of ASTM 65-45-12 ductile iron.

PART 3 EXECUTION

3.01 INSTALLATION

- A. In accordance with AWWA C605 and AWWA Manual 23.
- B. Joints:
 1. Rubber Gasketed: In accordance with manufacturer's written instructions.
 2. Solvent Cemented: In accordance with ASTM D2855.
 3. Restrained Joint Systems: In accordance with manufacturer's written instructions.
- C. Thrust Restraint:
 1. At a minimum, provide joint restraint at every valve and pipe fitting. Additional restraint shall be provided where indicated on the Drawings, based on restraint length calculations.
 2. Thrust blocking shall be used where detailed on the Drawings and as approved by Construction Manager.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- D. Pipe Bending for Horizontal or Vertical Curves:
 - 1. Bending of pipe barrels larger than 12 inches in diameter is not allowed.
 - 2. Radius of curves shall not exceed 75 percent of manufacturer's recommended values.
 - 3. Use blocks or braces at pipe joints to ensure axial deflection in gasketed or mechanical joints does not exceed allowable deflection.
- E. Maximum Joint Deflection 75 percent of manufacturer's recommended values.

3.02 INSPECTION AND HYDROSTATIC TESTING

- A. General:
 - 1. Notify Construction Manager in writing at least 5 days in advance of testing. Perform testing in presence of Construction Manager.
 - 2. Using water as test medium, all newly installed pipelines must successfully pass hydrostatic leakage test prior to acceptance.
 - 3. Conduct field hydrostatic test on buried piping after trench has been completely backfilled and compacted. Testing may, as approved by Construction Manager, be done prior to placement of asphaltic concrete or roadway structural section.
 - 4. Contractor may, if field conditions permit and as approved by Construction Manager, partially backfill trench and leave joints open for inspection and conduct an initial informal service leak test. Final field hydrostatic test shall not, however, be conducted until backfilling has been completed as specified above.
 - 5. Supply of Temporary Water: In accordance with Section 01 50 00, Temporary Facilities and Controls.
 - 6. Dispose of water used in testing in accordance with federal, state, and local requirements.
 - 7. Install temporary thrust blocking or other restraint as necessary to prevent movement of pipe and protect adjacent piping or equipment. Make necessary taps in piping prior to testing.
 - 8. Wait a minimum of 5 days after concrete thrust blocking is installed to perform pressure tests. If high-early strength cement is used for thrust blocking, wait may be reduced to 2 days.
 - 9. Prior to test, remove or suitably isolate appurtenant instruments or devices that could be damaged by pressure testing.
 - 10. New Piping Connected to Existing Piping:
 - a. Isolate new piping with grooved-end pipe caps, blind flanges, or other means as acceptable to Construction Manager.
 - b. Provide appropriate thrust blocking.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

B. Hydrostatic Testing Procedure:

1. Furnish testing equipment, as approved by Construction Manager, which provides observable and accurate measurements of leakage under specified conditions.
2. Maximum Filling Velocity: 0.25 foot per second calculated based on full area of pipe.
3. Expel air from piping system during filling.
4. Test Pressure: 125 percent of system operating pressure based on pressure as measured at lowest point.
5. Apply and maintain specified test pressure with hydraulic force pump. Valve off piping system when test pressure is reached.
6. Maintain hydrostatic test pressure continuously for 2 hours minimum.

C. Allowable Leakage: Allowable leakage is zero.

END OF SECTION

SECTION 33 05 01.12
GRAVITY SEWER PIPE AND FITTINGS

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Water Works Association (AWWA):
 - a. C105, Polyethylene Encasement for Ductile Iron Pipe Systems.
 - b. C110, Ductile-Iron and Gray-Iron Fittings.
 - c. C111, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
 - d. C205, Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4 in. (100 mm) and Larger - Shop Applied.
 - e. C208, Dimensions for Fabricated Steel Water Pipe Fittings.
 - f. C302, Reinforced Concrete Pressure Pipe, Noncylinder Type.
 2. ASTM International (ASTM):
 - a. A615/A615M, Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
 - b. A746, Standard Specification for Ductile Iron Gravity Sewer Pipe.
 - c. C76, Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
 - d. C150, Standard Specification for Portland Cement.
 - e. C361, Standard Specification for Reinforced Concrete Low-Head Pressure Pipe.
 - f. C425, Standard Specification for Compression Joints for Vitrified Clay Pipe and Fittings.
 - g. C443, Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
 - h. C596, Test Method for Drying Shrinkage of Mortar Containing Hydraulic Cement.
 - i. C700, Standard Specification for Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated.
 - j. D16, Standard Terminology for Paint, Related Coatings, Materials, and Applications.
 - k. D1248, Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable.
 - l. D1784, Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- m. D2241, Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
- n. D2412, Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
- o. D3034, Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
- p. D3212, Standard Specification for Joints For Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
- q. D3262, Standard Specification for “Fiberglass” (Glass-Fiber Reinforced Thermosetting-Resin) Sewer Pipe.
- r. D4161, Standard Specification for “Fiberglass” (Glass-Fiber Reinforced Thermosetting-Resin) Pipe Joints using Flexible Elastomeric Seals.
- s. E329, Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special inspection.
- t. F477, Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
- u. F679, Standard Specification for Poly(Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings.

1.02 DEFINITIONS

- A. PVC: Polyvinyl Chloride Pipe.
- B. SDR: Standard Dimension Ratio.

1.03 SUBMITTALS

- A. Action Submittals:
 - 1. Information on gasket polymer properties.
 - 2. Tee fabrication details.
 - 3. Application methods, application requirements, and chemical resistance data for coating and lining products.
 - 4. Complete Shop Drawings and laying diagrams showing location of each pipe section and, if special sections are provided, each special length.
- B. Informational Submittals:
 - 1. Certificates:
 - a. Manufacturer’s Certificate of Compliance, in accordance with Section 01 61 00, Common Product Requirements, that products furnished meet requirements of this section.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- b. Certification of Calibration: Approved testing laboratory certificate if pressure gauge for hydrostatic test has been previously used. If pressure gauge is new, no certificate is required.
2. Manufacturer's Written In-Plant Quality Control Program: Quality control procedures and materials testing to be used throughout manufacturing process. Submit prior to manufacture of any pipe for this Project.
3. Test or historical performance data to verify that joint design meets requirements of these Specifications.
4. Provide pipe test results with delivery of pipe. Do not deliver pipe not meeting test requirements to Project Site.
5. Manufacturer's written recommendations for pipe handling and installation.
6. Field Leakage Testing Plan:
 - a. Submit at least 15 days in advance of testing and include at least the following:
 - 1) Testing dates.
 - 2) Piping systems and sections to be tested.
 - 3) Test type.
 - 4) Method of isolation.
 - 5) Method of conveying water from source to system being tested.
 - 6) Calculation of maximum allowable leakage for piping section(s) to be tested.
 - 7) Method for disposal of test water, if applicable.

PART 2 PRODUCTS

2.01 PIPING

- A. Gravity Sewer Pipes: SDR26 in accordance with ASTM D3034. Diameter as shown on the Drawings.
- B. Joints: ASTM D3212 rubber gasketed.

2.02 GASKET LUBRICANT

- A. Lubricant shall be supplied by pipe manufacturer and no substitute or "or-equal" will be allowed.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

2.03 LATERAL SERVICE CONNECTION PIPE AND FITTINGS

- A. Use one type of service connection pipe material throughout. No interchanging of pipe and fittings allowed.
- B. Size shall be as shown on the Drawings.

2.04 PIPE TO MANHOLE CONNECTOR

- A. As specified in Section 33 05 13, Manholes.

2.05 FLEXIBLE COMPRESSION COLLAR

- A. Mechanical joint coupling with No. 305 stainless steel bands.
- B. Manufacturers:
 - 1. Calder, Inc., Bellflower, CA.
 - 2. Fernco, Inc., Davison, MI.
 - 3. Pipeconx Division of Uniseal; Evansville, IN.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Notify Engineer immediately of manufacturing imperfections or damage caused by improper handling.
- B. Verify size, pipe condition, and pipe class prior to installation of pipe.
- C. Repairs to pipe section will be allowed only if approved, in writing, by Engineer. Damaged pipe which, in opinion of Engineer, cannot be repaired, will be rejected and removed from Project Site.

3.02 PREPARATION

- A. Pipe Distribution: Do not distribute more than 1 week's supply of materials in advance of laying, unless otherwise approved by the Construction Manager.
- B. Inspect pipe and fittings prior to lowering into trench to ensure no cracked, broken, or otherwise defective materials are being used.
- C. Remove foreign matter and dirt from inside of pipe and fittings and keep clean during and after laying. Wash ends of section clean with wet brush prior to joining sections of pipe.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3.03 INSTALLATION

A. General:

1. Install pipe sections in accordance with manufacturer's recommendations.
2. Provide and use proper implements, tools, and facilities for safe and proper prosecution of Work.
3. Lower pipe, fittings, and appurtenances into trench, piece by piece, by means of crane, slings, or other suitable tools and equipment, in such a manner as to prevent damage to pipe materials, protective coatings, and linings. Do not drop or dump pipe into trenches.

B. Line and Grade:

1. Establish line and grade for pipe by use of lasers.
2. Measure for grade at pipe invert, not at top of pipe.
3. Do not deviate from line or grade, as shown on the Drawings, more than 1/2 inch, provided that such variation does not result in a level or reverse sloping invert.

C. Laying and Jointing:

1. Use gasket lubricant as recommended by gasket manufacturer.
2. Lay pipe upgrade with bell ends pointing in direction of laying.
3. When field cutting or machining pipe is necessary, use only tools and methods recommended by pipe manufacturer and approved by the Construction Manager.
4. After section of pipe has been placed in its approximate position for jointing, clean end of pipe to be joined, inside of joint, and rubber ring immediately before joining pipe.
5. Assemble joint in accordance with recommendations of manufacturer.
6. Apply sufficient pressure in making joint to assure that joint is correctly assembled as defined in standard installation instructions provided by pipe manufacturer. Inside joint space shall not exceed 50 percent of pipe manufacturer's recommended maximum allowance.
7. Place pipe to specified line and grade to form smooth flow line.
8. Ensure that bottom of pipe is in contact with bottom of trench for full length of each section.
9. Check for alignment and grade after joint has been made.
10. Place sufficient pipe bedding material to secure pipe from movement before next joint is installed.
11. When pipe is laid within movable trench shield, take precautions to prevent pipe joints from pulling apart when moving shield ahead.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

12. When laying operations are not in progress, and at close of day's work close and block open end of last laid section of pipe to prevent entry of foreign material or creep of gasketed joints.
13. Take precautions to prevent "uplift" or floating of line prior to completion of backfill operation.
14. Connections between one pipe material and another shall be by means of flexible compression collar, installed in accordance with manufacturer's recommendations, or concrete closure collar.

D. Connection to Structure or Manhole:

1. Locate standard pipe joint within 1.5 feet of outside face of structure for pipe 18 inches and smaller.
2. Plug or close off pipe stubbed with watertight plug.
3. Connect pipe to manhole with pipe to manhole connector in accordance with manufacturer's recommendations.

E. Crossing Waterlines: Where sewer crosses less than 18 inches below waterline, use ductile iron or PVC pressure pipe for crossing or encase in concrete envelope for a minimum distance of 9 feet on each side of waterline.

3.04 CONCRETE CLOSURE COLLAR

A. Use only when approved by the Construction Manager, and then only to make connections between dissimilar pipe or where standard rubber gasketed joints or flexible compression collars are impractical or unavailable.

B. Procedure:

1. Remove water from excavation. Placement of concrete in standing water will not be allowed.
2. Wash pipe to remove loose material.
3. Wrap and securely fasten light gauge sheet metal or building felt around pipe joint to ensure that concrete does not enter line.
4. Wet nonmetallic pipe thoroughly prior to concrete placement.
5. Placement shall be monolithic for each collar.
6. Place to minimum 6-inch thickness around outside diameter of pipe.
7. Extend concrete minimum of 12 inches on each side of joint.
8. Cure concrete, after initial set, by covering with well moistened earth.

3.05 SERVICE CONNECTION TEES

A. Install prior to leakage testing.

B. Install caps or plugs on tees.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- C. Install approved tee outlets with gasketed type joint or adapter to join service connection pipe.
- D. Install services to right-of-way line or as shown on the Drawings.

3.06 SERVICE CONNECTION INSTALLATION

- A. In general, service connections shall extend to street or alley right-of-way line, easement line, or as directed by Engineer.
- B. Minimum Slope: 1/4 inch per foot.
- C. Minimum Trench Depth: 4 feet at property line or on private property within permanent sewer easement. Engineer will determine required depth at end of line in each case.
- D. Progress of Construction: Unless otherwise approved by Engineer, install service connection not more than 5 days after backfilling of sewer trench in block or equivalent 400-foot section of sewer.
- E. Laying and Jointing of Service Connection Pipe and Fittings:
 - 1. Maximum deflection permissible with any one fitting shall not exceed 45 degrees, except by permission of Engineer.
 - 2. Make service connection to sewer system at manhole when directed by Engineer. Where service connection pipe is connected to manhole or concrete structure, make connection so standard pipe joint is located not more than 1.5 feet from structure unless PVC is used.
 - 3. Provide end of service connection line and fittings with standard watertight plug, cap, and stopper, suitably braced to prevent blow-off during hydrostatic or air testing.
- F. First length of pipe out from tee on lateral or main shall not be greater than 3 feet in length unless PVC pipe is used.
- G. Line and Grade for Service Connection Pipe and Fittings: When possible, lay pipe uniformly between tee or top of riser section and end of service connection. If a field conflict prevents uniform installation, propose an alternative method of installation to Engineer for approval. Where minimum slopes are used, confirm accuracy of pipe grade with a good quality builder's level not less than 24 inches long.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

H. Existing Service Connections:

1. Locate by excavating prior to constructing tee in new sewer pipeline.
2. Disconnect from existing pipelines to be abandoned and reconnect them to new sewer pipeline.

3.07 CLEANING

- A. Clean each section of completed sewer pipeline prior to testing.
- B. Place screen or dam in downstream manhole of section being cleaned to catch debris.
- C. Remove material from each manhole section before cleaning next section downstream.
- D. Cleaning water may be discharged into existing sewer system after screening and removal of debris. Dispose of cleaning water in a manner that will not damage or interfere with adjacent property and in a manner acceptable with Engineer and regulatory agencies. Cleaning water may not be discharged into existing sewer system after screening and removal of debris.

3.08 TESTING

A. General:

1. Notify Engineer in writing 5 days in advance of testing. Perform testing in presence of Engineer.
2. Test pipe 18 inches in diameter and smaller for leakage using Pneumatic Test Methods.
3. Pipe shall successfully pass leakage test prior to acceptance.
4. Test sections of constructed sewer between stations only after service connections, manholes, and backfilling are completed.
5. Isolate new pipelines that are connected to existing pipelines for testing. Install pipe plugs as required to allow section of new pipe to be pressure tested.
6. Furnish testing equipment and perform tests as approved by Engineer. Testing equipment shall provide observable and accurate measurement of test pressure and amount of water needed to maintain specified conditions.
7. Supply of Temporary Water: As stated in Section 01 50 00, Temporary Facilities and Controls.
8. Dispose of water used in testing in accordance with federal, state, and local requirements.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

B. Pneumatic Testing for 18-inch and Smaller Diameter Pipe:

1. Equipment:
 - a. Calibrate gauges with standardized test gauge provided by Contractor at start of each testing day. Construction Manager will witness calibration.
 - b. Install compressor, air piping manifolds, gauges, and valves at ground surface.
 - c. Provide pressure release device, such as rupture disc or pressure relief valve, to relieve pressure at 6 psi or less.
 - d. Restrain plugs used to close sewer lines to prevent blowoff.
2. Procedure:
 - a. No person shall enter manhole or structure, or occupy area above opening of manhole or structure where pipe is under pressure.
 - b. Determine height of groundwater table at time of test.
 - c. Slowly introduce air into pipe section until internal air pressure reaches 4 psi greater than average backpressure of groundwater submerging pipe.
 - d. Allow 2 minutes minimum for air temperature to stabilize.
 - e. Allowable leakage for sewers constructed of air-permeable materials, such a concrete or clay:
 - 1) When pressure is decreased to 3.5 psig, air pressure test shall begin.
 - 2) Test shall consist of measuring time in seconds for pressure in pipe to drop from 3.5 psig to 2.5 psig.
 - 3) Pipe leakage shall be considered acceptable if time in seconds for pressure drop is equal to or greater than required time as calculated below:

$$K = 0.0111d^2L$$
$$C = 0.000392dL$$

If C_t is less than or equal to 1.0, then time = K_t

If C_t is between 1.0 and 1.75, then time = K_t/C_t

If C_t is greater than or equal to 1.75, then time = $K_t/1.75$

Where:

- d = pipe diameter in inches
- L = pipe length in feet
- K = value for each length of pipe of a specific diameter
- C = value for each length of pipe of a specific diameter
- K_t = Sum of all K values
- C_t = Sum of all C values

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- f. This method is based on allowable air loss rate of 0.003 cubic foot per minute (cfm) per square foot of internal pipe surface, with total air loss rate not less than 2.0 cfm nor greater than 3.5 cfm.
- g. Allowable leakage for sewers constructed of nonair-permeable materials such as ductile iron, and polyvinyl chloride (PVC).
 - 1) When nonair-permeable pipe is subjected to low pressure air test, time in seconds for pressure drop shall be equal to or greater than three times required time calculated using procedure above.
 - 2) Defective Piping Sections: Replace and seal individual joints and retest as specified.

C. Infiltration Test:

- 1. Where groundwater is 2 feet above top of a section of pipe, measure flow of water in pipe and rates of infiltration using a calibrated weir. Leave weir in line until flow rate has stabilized. Verify groundwater elevation.
 - a. Maximum Acceptable Total Infiltration of Groundwater as Determined by Test: 50 gallons per 24 hours per inch-mile of pipe.
 - b. Make infiltration tests on all sewer construction before placing lines in service and before making any connections to other sewers.
 - c. If amount of infiltration into sewer(s) is in excess of maximum quantity specified above, repair joints, relay sewer (if necessary), or perform other remedial construction as required.
 - d. Repeat test until each sewer meets specified infiltration amount.

D. Test Report Documentation:

- 1. Test date.
- 2. Pipe section tested.
- 3. Test method.
- 4. Test pressure.
- 5. Length of test.
- 6. Pressure or water loss.
- 7. Remarks, including:
 - a. Leaks (type, location).
 - b. Repair/replacement performed to remedy excessive leakage.
- 8. Signed by Contractor and Engineer to represent that test has been satisfactorily completed.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- E. Subsequent Failure: Visible infiltration of groundwater following successful test shall be considered evidence that original test was in error or that subsequent failure of pipeline has occurred.

- F. PVC Pipe Deflection Test:
 - 1. Contractor is responsible for providing all labor and equipment for deflection testing.
 - 2. Test deflection of pipe by manually pulling, with twine, a one-piece, nine-arm, go/no-go mandrel (sized in accordance with ASTM D3034) through pipe. Within 24 hours after compaction of backfill is complete, line shall be tested using 5 percent deflection mandrel. If line is satisfactory, it shall be retested using 7.5 percent deflection mandrel no less than 30 days following completion of compaction.
 - 3. Correcting Deficiencies or Obstructions:
 - a. Excavate to springline of pipeline and replace and recompact pipe zone material.
 - b. Internal pipe rerounding or vibration will not be allowed.
 - c. If pipe does not pass mandrel test after replacement of pipe zone material and trench backfill, re-excavate and replace pipeline.

3.09 INSPECTION

- A. Deficiencies Requiring Correction:
 - 1. Variations in alignment greater than specified herein.
 - 2. Joint separations greater than allowed by pipe manufacturer.
 - 3. Visible infiltration.
 - 4. Presence of debris or foreign objects.
 - 5. Obvious damage or defects in pipeline.
 - 6. Sags, bellies, or negative slopes.
 - 7. Slope less than minimum allowable.

END OF SECTION

SECTION 33 05 13
MANHOLES

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards that may be referenced in this section:
1. American Association of State Highway and Transportation Officials (AASHTO): M198, Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants.
 2. ASTM International (ASTM):
 - a. A36/A36M, Standard Specification for Carbon Structural Steel.
 - b. A48/A48M, Standard Specification for Gray Iron Castings.
 - c. A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - d. A536, Standard Specification for Ductile Iron Castings.
 - e. A615/A615M, Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
 - f. B139/B139M, Standard Specification for Phosphor Bronze Rod, Bar, and Shapes.
 - g. C14, Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe.
 - h. C31/C31M, Standard Practice for Making and Curing Concrete Test Specimens in the Field.
 - i. C39/C39M, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 - j. C150/C150M, Standard Specification for Portland Cement.
 - k. C192/C192M, Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory.
 - l. C387/C387M, Standard Specification for Packaged, Dry, Combined Materials for Mortar and Concrete.
 - m. C443, Standard Specification for Joints for Concrete Pipe and Manholes Using Rubber Gaskets.
 - n. C478, Standard Specification for Precast Reinforced Concrete Manhole Sections.
 - o. C923, Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals.
 - p. C990, Standard Specification for Joints in Concrete Pipe, Manholes, and Precast Box Sections using Preformed Flexible Joint Sealants.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- q. C1311, Standard Specification for Solvent Release Sealants.
 - r. C1244, Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill.
 - s. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - t. D4101, Standard Specification for Propylene Injection and Extrusion Materials.
 - u. F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
 - v. F594, Standard Specification for Stainless Steel Nuts.
3. JEA Water & Wastewater Standards Manual.

1.02 SUBMITTALS

A. Action Submittals:

- 1. Shop Drawings including details of construction, reinforcing and joints, anchors, lifting, erection inserts, and other items cast into members.
- 2. Product Data:
 - a. Concrete mix design.
 - b. Manhole frame to structure seals.
 - c. Manhole frame to structure anchor bolt.
 - d. Rubber gaskets and sealants.
 - e. External joint wrap.

B. Informational Submittals:

- 1. Experience Record:
 - a. Precast concrete production capabilities.
 - b. Evidence of current PCI plant certification.
- 2. Certificate of Compliance: Certify admixtures and concrete do not contain calcium chloride.
- 3. Test Reports: Precast manufacturer's concrete test cylinders.
- 4. Manufacturer's recommended installation instructions.
- 5. Field quality control report.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications:

- 1. Precast Concrete and Precast Prestressed Concrete: Product of manufacturer with 3 years' experience producing precast concrete products of quality specified.
- 2. Precast Plant: PCI certified plant with current certification.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

PART 2 PRODUCTS

2.01 GENERAL

A. Materials of Construction and Service Conditions:

1. Screws, Bolts, or Nuts: Type 304 stainless steel conforming to ASTM F593 and ASTM F594.
2. Gaskets:
 - a. Internal and external seals shall be made of materials that have been proven to be resistant to the following exposures and conditions:
 - 1) Sanitary sewage.
 - 2) Corrosion or rotting under wet or dry conditions.
 - 3) Gaseous environment in sanitary sewers and at road surfaces including common levels of ozone, carbon monoxide, and other trace gases at installation site.
 - 4) Biological environment in soils and sanitary sewers.
 - 5) Chemical attack by road salts, road oil, and common street spillages or solvents used in street construction or maintenance.
 - 6) Temperature ranges, variations, and gradients in construction area.
 - 7) Variations in moisture conditions and humidity.
 - 8) Fatigue failure caused by a minimum of 30 freeze-thaw cycles per year.
 - 9) Vibrations because of traffic loading.
 - 10) Fatigue failure because of repeated variations of tensile, compressive and shear stresses, and repeated elongation and compression. Material shall remain flexible allowing repeated movement.
3. Materials shall be compatible with each other and manhole materials.
4. Designed to provide a 20-year service life.

B. Structures shall meet requirements of ASTM C478, this specification and the following:

1. Concrete:
 - a. Cement: Meet requirements of ASTM C150/C150M.
 - b. Compressive Strength:
 - 1) Minimum 4,000 psi.
 - 2) Minimum strength shall be confirmed at 7 days by making two standard cylinders per manhole for testing.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- c. Comply with Section 03 30 00, Cast-in-Place Concrete for other concrete mix requirements.
2. Reinforcement: Grade 60, unless otherwise specified.
3. Ring: Custom made with openings to meet indicated pipe alignment conditions and invert elevations.
4. Floor: Minimum 3 inches below pipe to provide clearance for grouting channels.
5. Joint:
 - a. Form joint contact services with machined castings.
 - b. Surfaces shall be parallel with nominal 1/16-inch clearing and tongue equipped with recess for installation of O-ring rubber gasket.
6. Gasket: Meet requirements of ASTM C443.

2.02 PRECAST MANHOLES

A. Riser Sections:

1. Fabricate in accordance with ASTM C478.
2. Diameter Size: As shown on the Drawings.
3. Wall Thickness: As shown on the Drawings.
4. Top and bottom surfaces shall be parallel.
5. Joints: Tongue-and-groove or confined O-ring with rubber gaskets meeting ASTM C443.

B. Cone Sections:

1. Eccentric.
2. Same wall thickness and reinforcement as riser section.
3. Top and bottom surfaces shall be parallel.

C. Base Sections and Base Slab:

1. Base slab integral with sidewalls.
2. Fabricate in accordance with ASTM C478.

D. Manhole Extensions:

1. Concrete grade rings; maximum 6 inches high.
2. Fabricate in accordance with ASTM C478.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

E. Joint Seal Manufacturers and Products:

1. Confined Plastic or Rubber O-Ring:
 - a. As recommended by precasting manufacturer.
 - b. Meet requirements of ASTM C443.
2. External Wrap:
 - a. Sealing Systems, Inc., Loretto, MN; Gator Wrap.
 - b. Henry Company, Houston, TX; RU116 Rubr-Nek External Joint Wrap.
 - c. Trelleborg Engineered Solutions, Park Hills, MO; NPC External Joint Wrap.
 - d. Cretex Specialty Products, Waukesha, WI; Cretex Wrap.

2.03 CAST-IN-PLACE MANHOLES

- A. Concrete: As specified in Section 03 30 00, Cast-in-Place Concrete.
- B. Reinforcing Steel: As specified in Section 03 21 00, Steel Reinforcement.

2.04 MANHOLE FRAMES AND COVER

- A. Castings:
 1. Tough, close-grained gray iron, sound, smooth, clean, free from blisters, blowholes, shrinkage, cold shuts, and defects.
 2. Cast Iron: ASTM A48/A48M Class 35B.
 3. Ductile Iron: ASTM A536, Grade 60-40-12.
 4. Plane or grind bearing surfaces to ensure flat, true surfaces.
- B. Cover: Label sewer manholes with the word SEWER in 2-inch raised letters.
- C. Capscrews for Watertight, Tamper-Proof Covers: High temper phosphor bronze with 60,000 psi minimum tensile strength meeting ASTM B139/B139M.
- D. Watertight Cover Gasket: Molded from high-quality rubber such as nitrile or EPDM.

2.05 MANHOLE FRAME CONNECTION TO STRUCTURE

- A. Butyl Sealant:
 1. Conform to ASTM C1311, or AASHTO M198 and ASTM C990.
 2. Trowelable or cartridge applied.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3. Manufacturers and Products:
 - a. Tremco Commercial Sealants and Waterproofing, Beachwood, OH; Tremco Butyl Sealant.
 - b. Bostik, Middleton, MA; Chem-Calk 300.
 - c. Press-Seal Gasket Company, Fort Wayne, IN; EZ-Stik #3.

- B. External Wrap:
 1. Meet requirements of ASTM C923.
 2. Construct of high-quality rubber that will provide flexible watertight seal around joint.
 3. Thickness: Minimum 60 mils.
 4. Consist of a top and bottom section and be sealed to structure, frame top, and bottom with mastic as applicable.
 5. Length: Extend from manhole frame and extension ring to cone section.
 6. Bands: If required, constructed of minimum 16-gauge sheet if channeled, or 5/16-inch diameter if round.
 7. Manufacturers and Products:
 - a. Sealing Systems, Inc., Loretto, MN; Infi-Shield.
 - b. Trelleborg Engineered Systems, Milford, NH; NPC Flexrib Frame-Chimney Seals.
 - c. Cretex Specialty Products, Waukesha, WI; X-85 Seal.

- C. Internal Wrap or Sealing Membrane:
 1. Meet requirements of ASTM C923.
 2. Minimum internal thickness of 3/16 inch or as recommended by manufacturer for installation climate.
 3. Designed for application and have a demonstrated history of accommodating differential expansion between frame and concrete.
 4. Width: Minimum 8 inches.
 5. Expansive type wraps shall be fabricated of high-quality rubber or urethane.
 6. Bands: If required, constructed of minimum 16-gauge sheet if channeled, or 5/16-inch diameter if round.
 7. Wrap shall not restrict access to manhole.
 8. Manufacturers and Products:
 - a. Sealing Systems, Inc., Loretto, MN; Flex-Seal Utility Sealant.
 - b. Trelleborg Engineered Systems, Milford, NH; NPC Flexrib Frame-Chimney Seals.
 - c. Cretex Specialty Products, Waukesha, WI; Internal Manhole Chimney Seal.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

D. Frame to Structure Anchor Bolts:

1. 3/4-inch-diameter HAS stainless steel bolts; minimum 6-5/8-inch embedment.
2. Manufacturer and Product: Hilti; HVA Capsules Adhesive Anchoring System.

2.06 COATINGS

- A. Provide a corrosion resistant coating in sewer manholes in accordance with JEA Water & Wastewater Standards Manual Sections 427 and 446.

2.07 MORTAR

- A. Standard premixed in accordance with ASTM C387/C387M, or proportion one part Portland cement to two parts clean, well-graded sand that will pass a 1/8-inch screen.
- B. Admixtures:
1. May be included; do not exceed the following percentages of weight of cement:
 - a. Hydrated Lime: 10 percent.
 - b. Diatomaceous Earth or Other Inert Material: 5 percent.
- C. Mix Consistency:
1. Tongue-and-Groove Type Joint: Such that mortar will readily adhere to pipe.
 2. Confined Groove (Keylock) Joint: Such that excess mortar will be forced out of groove and support is not provided for section being placed.

2.08 BACKFILL AROUND AND UNDER MANHOLE

- A. Structural fill as specified in Section 31 23 23, Fill and Backfill.

2.09 FLEXIBLE JOINTS FOR SEALING PIPES IN MANHOLE

- A. Manufacturers and Products:
1. NPC, Inc., Milford, New Hampshire; Kor-N-Seal flexible rubber boot with stainless steel accessories.
 2. A-LOK Products, Inc., Tullytown, PA; Z-LOK XP or A-LOK flexible connectors.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- B. Doghouse Manhole/Manhole Over Existing Pipe (where use of a boot is not possible): Green Streak; hydrophilic waterstop CJ-0725-3k.

2.10 SOURCE QUALITY CONTROL

- A. Prior to delivery of precast manhole sections to Site, yard permeability tests may be required at point of manufacture. Engineer or Construction Manager will select precast sections to test from material which is to be supplied to Project. Test specimens shall be mat tested and meet permeability test requirements of ASTM C14.
- B. Concrete Testing: Test two concrete test cylinders for each manhole. Compressive strength shall be tested in accordance with ASTM C31/C31M, ASTM C39/C39M, and ASTM C192/C192M.
- C. Inspection:
 - 1. Material Quality:
 - a. Manufacturing process and finished sections shall be subject to inspection and approval by Owner and Engineer.
 - 1) Inspections may take place at manufacturer's plant, at Site after delivery, or at both.
 - 2) Sections not meeting requirements of this Specification or that are determined to have defects which may affect durability of structure are subject to rejection.
 - 3) Sections rejected after delivery shall be removed and replaced.
 - 4) Sections damaged after delivery will be rejected and if already installed shall be repaired to satisfaction of Owner and Engineer.
 - 5) If structure cannot be repaired, it shall be removed and replaced entirely at Contractor's expense.
 - 2. At the time of inspection, the sections will be carefully examined for compliance with ASTM C478 and with manufacturer's drawings. Sections will be inspected for general appearance, dimensions, scratch strength, blisters, cracks, roughness, and soundness. Surface shall be dense and close textured.
 - 3. Imperfections may be repaired, subject to approval of Engineer, after demonstration by manufacturer that strong and permanent repairs result.

PART 3 EXECUTION

3.01 GENERAL

- A. Prior to installation inspect materials:
 - 1. Sections not meeting requirements of this specification or that are determined to have defects which may affect durability of structure are subject to rejection.
 - 2. Sections damaged after delivery will be rejected and if already installed shall be repaired to satisfaction of Owner and Engineer.
 - 3. Remove and replace structure that cannot be repaired.
- B. If needed, dewater excavation during construction and testing operations.

3.02 EXCAVATION AND BACKFILL

- A. Excavation: As specified in Section 31 23 16, Excavation.
- B. Backfill:
 - 1. As specified in Section 31 23 23, Fill and Backfill.
 - 2. Place structural fill under manhole in 6-inch maximum lifts; minimum of 12 inches unless otherwise specified on the Drawings. Compact each lift to 98 percent relative compaction as determined in accordance with ASTM D698.

3.03 INSTALLATION OF PRECAST MANHOLES

- A. Concrete Base:
 - 1. Precast:
 - a. Place on compacted structural fill.
 - b. Properly locate, ensure firm bearing throughout, and plumb first section.
 - 2. Cast-in-Place:
 - a. Invert: Minimum 8 inches below lowest connecting pipe.
 - b. First section of manhole shall be cast in concrete base.
- B. Sections:
 - 1. Inspect precast manhole sections to be joined.
 - 2. Clean ends of sections to be joined.
 - 3. Do not use sections with chips or cracks in tongue.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- C. Preformed Plastic Gaskets or Rubber O-Ring:
 - 1. Use only pipe primer furnished by gasket manufacturer.
 - 2. Install gasket material in accordance with manufacturer's instructions.
 - 3. Completed Manhole: Rigid and watertight.

- D. Mortar Joints:
 - 1. Thoroughly wet joint with water prior to placing mortar.
 - 2. Place mortar on groove of lower section prior to section installation.
 - 3. Fill joint completely with mortar of proper consistency.
 - 4. Trowel interior and exterior surfaces smooth on standard tongue-and-groove joint.
 - 5. Prevent mortar from drying out and cure by applying approved curing compound or comparable approved method.
 - 6. Do not use mortar mixed for longer than 30 minutes.
 - 7. Chip out and replace cracked or defective mortar.
 - 8. Completed Manhole: Rigid and watertight.

- E. External Joint Wraps: Install in accordance with manufacturer's instructions.

- F. Extensions:
 - 1. Provide on manholes in streets or other locations where change in existing grade may be likely.
 - 2. Install to height not exceeding 12 inches.
 - 3. Lay grade rings in mortar with sides plumb and tops level.
 - 4. Seal joints with mortar as specified for sections and make watertight.

3.04 MANHOLE INVERT

- A. Construct with smooth transitions to ensure unobstructed flow through manhole. Remove sharp edges or rough sections that tend to obstruct flow.

- B. Where full section of pipe is laid through manhole, break out top section and cover exposed edge of pipe completely with mortar. Trowel mortar surfaces smooth.

3.05 MANHOLE FRAMES AND COVERS

- A. Install concrete grade rings as required to set covers flush with surface of adjoining pavement or ground surface, unless otherwise shown or directed.

- B. Set frames in three equally spaced beads of butyl sealant that run full circumference of frame.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- C. Anchor frame to manhole with specified bolts.
- D. Install manhole frame to structure seals in accordance with manufacturer's instructions. Seal shall cover grade rings.

3.06 WATERTIGHT MANHOLES

- A. Unless otherwise noted, sewer manhole covers shall be bolted down with sealing gasket.

3.07 MANHOLE PIPING

- A. Drop Assembly: See Drawings for detail of installation requirements.
- B. Flexible Joints:
 - 1. Provide in pipe not more than 1-1/2 feet from manhole walls.
 - 2. Where last joint of pipe is between 1-1/2 feet and 6 feet from manhole wall, provide flexible joint in manhole wall.
- C. Stubouts for Future Connections:
 - 1. Provide same type and class of pipe as specified for use in service connection, lateral, main, or trunk sewer construction. Where there are two different classes of pipe at manhole use higher strength pipe.
 - 2. Grout pipe in precast walls or manhole base to provide watertight seal or use flexible joints as specified herein.
 - 3. Maximum Length: 1-1/2 feet outside manhole wall.
 - 4. Construct invert channels as shown.
 - 5. Test Plugs:
 - a. Install rubber-gasketed plugs in end of stubouts with gasket joints similar to sewer pipe being used.
 - b. Plugs shall withstand internal or external pressures without leakage.
 - c. Adequately brace plugs against hydrostatic or air test pressures.
- D. Permanent Plugs:
 - 1. Clean interior contact surfaces of pipes to be cut off or abandoned as shown, and construct plug as follows:
 - a. Pipe 18 Inches or Less in Diameter: Concrete plug in end, minimum 2 feet long.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- b. Pipe 20 Inches and Larger: Concrete plug in end, minimum 4 feet long.
- c. Plugs shall be watertight and capable of withstanding internal and external pressures without leakage.

3.08 MANHOLES OVER EXISTING PIPING

- A. Maintain flow through existing pipelines at all times.
- B. Concrete Pipe: Apply bonding agent on surfaces in contact with concrete.
- C. Construct base under existing piping.
- D. Construct manhole as detailed in Drawings.
- E. Apply minimum of two complete wraps of hydrophilic waterstop centered on pipe in wall.
- F. Place a minimum of 24 inches of concrete around each pipe penetration outside manhole against undisturbed soil or compacted aggregate unless otherwise detailed.
- G. Grout channel through manhole.
- H. Saw cut out or demolish existing pipe within new manhole using method approved by Engineer.
- I. Protect new concrete or grout for 7 days after placing concrete.

3.09 CONNECTIONS TO EXISTING MANHOLES

- A. Core manhole bases and grouting as necessary.
- B. Seal pipe in manhole using flexible connector.
- C. Regrout to provide smooth flow into and through manholes.
- D. Provide diversion facilities and perform work necessary to maintain flow during connection.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3.10 FIELD QUALITY CONTROL

A. Hydrostatic Testing:

1. When, in Engineer's opinion, groundwater table is too low to permit visual detection of infiltration leaks, hydrostatically test manholes.
2. Procedure: Plug inlets and outlets and fill manhole with water to height determined by Engineer.
3. Manhole may be filled 24 hours prior to time of testing, if desired, to permit normal absorption into pipe walls to take place.
4. Leakage in each manhole shall not exceed 0.1 gallon per hour per foot of head above invert.
5. Repair manholes that do not meet leakage test, or do not meet specified requirements from visual inspection.
6. If more than 25 percent of manholes tested fail the hydrostatic test, test all or as many manholes as Engineer deems necessary.

END OF SECTION

SECTION 33 05 16.13
PRECAST CONCRETE UTILITY STRUCTURE

PART 1 GENERAL

1.01 DESCRIPTION

- A. This specification section is for the Oil Water Separator (OWS) detailed on the Drawings.

1.02 REFERENCES

- A. The following is a list of standards that may be referenced in this section:
1. American Association of State Highway and Transportation Officials (AASHTO): HB-17, Standard Specifications for Highway Bridges, Division 1 Section 3, Division I Design-Loads (Part A, Part B, Part C).
 2. ASTM International (ASTM):
 - a. A497/A497M, Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete.
 - b. A615/A615M, Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
 - c. C387/C387M, Standard Specification for Packaged, Dry, Combined Materials for Mortar and Concrete.
 - d. C478, Standard Specification for Precast Reinforced Concrete Manhole Sections.
 - e. C857, Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.
 - f. C858, Standard Specification for Underground Precast Concrete Utility Structures.
 - g. D4101, Standard Specification for Propylene Injection and Extrusion Materials.
 3. Occupational Safety and Health Administration (OSHA):
 - a. 29 CFR 1910.27, Fixed Ladders.
 - b. 29 CFR 1926.502, Fall Protection Systems Criteria and Practices.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

1.03 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:

- a. Detailed drawings showing complete information for fabrication including, but not limited to:
 - 1) Member dimensions and cross sections; location, size, and type of reinforcement, including additional reinforcement.
 - 2) Layout dimensions and identification of OWS.
 - 3) Welded connections indicated by AWS standard symbols.
 - 4) Details of connections, joints, accessories, and openings or inserts.
 - 5) Watertight joint details.
 - 6) Location and details of anchorage devices.
 - 7) Access manhole details.
- b. Product Data:
 - 1) Precast concrete items; show materials of construction by ASTM reference and grade.
 - 2) Joint sealants.

B. Informational Submittals:

- 1. Manufacturer's data for lifting devices for handling and erection.
- 2. Manufacturer's certification that vault design and manufacture comply with referenced ASTMs (for example, ASTM C857 and ASTM C858).
- 3. Vault design calculation shall be signed by a civil or structural engineer registered in the State of Florida.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Store each unit in a manner that will prevent cracking, distortion, warping, straining and other physical damage, and in a manner to keep marking visible.
- B. Lift and support each unit only at designated lifting points and supporting points as shown on Shop Drawings.

PART 2 PRODUCTS

2.01 VAULT MANUFACTURERS

- A. Materials, equipment, and accessories specified in this section shall be products of:
1. Oldcastle Precast.
 2. Jensen Precast.
 3. Hanson Pipe and Precast.

2.02 PRECAST CONCRETE VAULTS

- A. Design Requirements:
1. In the event of a conflict between or among standards, the more stringent standard shall govern.
 2. Comply with ASTM C858, except as modified herein.
 3. Reinforcing Steel:
 - a. Deformed Bars: ASTM A615/A615M, Grade 60.
 - b. Welded Wire Fabric: ASTM A497/A497M.
 4. Nominal Dimensions: As shown on the Drawings.
 5. Construction: Rigid type and behave monolithically.
 6. Design Loads: As determined by ASTM C857, and by using Site-specific values presented in Geotechnical Design Report.
 - a. Live Loads: AASHTO HS20-44 truck loading plus impact.
 - b. Uplift: Designed to avoid flotation with a factor of safety equal to 1.2.
 7. Design shall accommodate additional stresses or loads that may be imposed during factory pre-casting, transporting, erection, and placement.
 8. Blockouts for penetrations shall be as shown on the Drawings.
 9. Sealant:
 - a. Non-swelling preformed joint sealants to provide a lasting, watertight bond.
 - b. Manufacturer and Product: Henry Company; RAM-NEK.
 10. Mortar: Comply with ASTM C387/C387M, Type S.
- B. Mark each member or element to indicate location in the structure, top surface, and date of fabrication.

2.03 ACCESSORIES

- A. Ladder: Not required.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- B. Polypropylene Steps: Not required.
- C. Hatches: Hatches shall be provided with antislip coating.
- D. Pipe Connections to Vault: Flexible joint conforming to requirements of Section 33 05 13, Manholes.

PART 3 EXECUTION

3.01 GENERAL

- A. Possible Settlement: If subgrade is encountered that may require removal to prevent structure settlement, notify Engineer. Engineer will determine depth of over excavation and means of stabilizing subgrade prior to structure installation.
- B. Place 6-inch minimum thickness of imported crushed aggregate material on undisturbed earth or modified subgrade; thoroughly compact with a mechanical vibrating or power tamper. Meet requirements of Article Excavation and Backfill.

3.02 EXCAVATION AND BACKFILL

- A. Remove and keep water clear from excavation during construction.
- B. Excavation: As specified in Section 31 23 16, Excavation.
- C. Backfill: As specified in Section 31 23 23, Fill and Backfill, and Section 31 23 23.15, Trench Backfill.

3.03 INSTALLATION

- A. Concrete Base:
 - 1. Place on prepared subgrade.
 - 2. Properly locate, ensure firm bearing throughout, and plumb first section.
- B. Sections:
 - 1. Carefully inspect precast sections to be joined.
 - 2. Thoroughly clean ends of sections to be joined.
 - 3. Do not use sections with chips or cracks.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- C. Joints:
 - 1. Fill joints between precast sections per manufacturer's recommendation.
 - 2. Joints shall be watertight to prevent entrance of groundwater.
- D. Setting Precast Vault: Install vault to elevations shown on the Drawings.
- E. Watertight construction below grade with no open cracks or spalls. Cracking and defective areas of concrete shall be repaired per requirements of Section 03 30 00, Cast-in-Place Concrete.

END OF SECTION

SECTION 33 13 00
DISINFECTION OF WATER UTILITY DISTRIBUTION FACILITIES

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Water Works Association (AWWA):
 - a. B300, Hypochlorites.
 - b. B301, Liquid Chlorine.
 - c. B302, Ammonium Sulfate.
 - d. B303, Sodium Chlorite.
 - e. C651, Disinfecting Water Mains.
 - f. C652, Disinfection of Water Storage Facilities.
 - g. C653, Disinfection of Water Treatment Plants.
2. NSF International (NSF):
 - a. NSF/ANSI 61, Drinking Water System Components - Health Effects.
 - b. NSF/ANSI 372, Drinking Water System Components - Lead Content.
3. Standard Methods for the Examination of Water and Wastewater, as published by American Public Health Association, American Water Works Association, and the Water Environment Federation.

1.02 SUBMITTALS

A. Informational Submittals:

1. Plan describing and illustrating conformance to appropriate AWWA standards and this Specification.
2. Procedure and plan for cleaning system.
3. Procedures and plans for disinfection and testing.
4. Proposed locations within system where Samples will be taken.
5. Type of disinfecting solution and method of preparation.
6. Certification that employees working with concentrated chlorine solutions or gas have received appropriate safety training.
7. Method of disposal for highly chlorinated disinfecting water.
8. Certified Bacteriological Test Results:
 - a. Facility tested is free from coliform bacteria contamination.
 - b. Forward results directly to Engineer.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

1.03 SEQUENCING

- A. Commence disinfection after completion of following:
 - 1. Completion and acceptance of internal painting of system(s).
 - 2. Hydrostatic and pneumatic testing, pressure testing, functional and performance testing and acceptance of pipelines, pumping systems, structures, and equipment.
 - 3. Disinfection of: Pumps and associated system piping.

PART 2 PRODUCTS

2.01 GENERAL

- A. Components and Materials in Contact with Water for Human Consumption: Comply with the requirements of the Safe Drinking Water Act and other applicable federal, state, and local requirements. Provide certification by manufacturer or an accredited certification organization recognized by the Authority Having Jurisdiction that components and materials comply with the maximum lead content standard in accordance with NSF/ANSI 61 and NSF/ANSI 372.
 - 1. Use or reuse of components and materials without a traceable certification is prohibited.

2.02 WATER FOR DISINFECTION AND TESTING

- A. Clean, uncontaminated, and potable.
- B. Owner will supply potable quality water. Contractor shall convey in disinfected pipelines or containers.

PART 3 EXECUTION

3.01 GENERAL

- A. Conform to AWWA C651 for pipes and pipelines and Section 350 of the JEA Water and Wastewater Standards, except as modified in these Specifications.
- B. Contractor's Equipment:
 - 1. Furnish chemicals and equipment, such as pumps and hoses, to accomplish disinfection.
 - 2. Water used to fill pipeline may be supplied using a temporary connection to existing distribution system. Provide protection against cross-connections as required by AWWA C651.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- C. Disinfect the following items installed or modified under this Project, intended to hold, transport, or otherwise contact potable water:
 - 1. Pipelines: Disinfect new pipelines that connect to existing pipelines up to point of connection.
 - 2. Disinfect surfaces of materials that will contact finished water, both during and following construction, using one of the methods described in AWWA C652 and AWWA C653. Disinfect prior to contact with finished water. Take care to avoid recontamination following disinfection.
- D. Prior to application of disinfectants, clean pipelines of loose and suspended material.
- E. Allow freshwater and disinfectant solution to flow into pipe or vessel at a measured rate so chlorine-water solution is at specified strength. Do not place concentrated liquid commercial disinfectant in pipeline or other facilities to be disinfected before it is filled with water.

3.02 TURBIDITY

- A. Cleaning of equipment and facilities shall include removal of materials that result in a turbidity exceeding limits stated in Article Testing.

3.03 PIPING AND PIPELINES

- A. Cleaning:
 - 1. Before disinfecting, clean foreign matter from pipe in accordance with AWWA C651.
 - 2. If continuous feed method or slug method of disinfection, as described in AWWA C651, are used flush pipelines with potable water until clear of suspended solids and color. Provide hoses, temporary pipes, ditches, and other conduits as needed to dispose of flushing water without damage to adjacent properties.
 - 3. Flush pipe through flushing branches and remove branches after flushing is completed.
- B. Disinfecting Procedure: In accordance with AWWA C651, unless herein modified.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

3.04 DISPOSAL OF CHLORINATED WATER

- A. Do not allow flow into a waterway without neutralizing disinfectant residual.
- B. See appendix of AWWA C651 for acceptable neutralization methods.

3.05 TESTING

- A. Collection of Samples:
 - 1. Coordinate activities to allow Samples to be taken in accordance with this Specification.
 - 2. Provide valves at sampling points.
 - 3. Provide access to sampling points.
- B. Test Equipment:
 - 1. Clean containers and equipment used in sampling and make sure they are free of contamination.
 - 2. Obtain sampling bottles with instructions for handling from Owner's an independent testing laboratory.
- C. Chlorine Concentration Sampling and Analysis:
 - 1. Collect and analyze Samples in accordance with AWWA Standards.
 - 2. Analysis to be performed by Owner's laboratory. Samples will be analyzed using amperometric titration method for free chlorine as described in latest edition of Standard Methods for Examination of Water and Wastewater.
- D. After pipelines have been cleaned, disinfected, and refilled with potable water, Owner will take water Samples and have them analyzed for conformance to bacterial limitations for public drinking water supplies.
 - 1. Collect Samples in accordance with applicable AWWA Standard.
 - 2. Analyze Samples for coliform concentrations in accordance with latest edition of Standard Methods for the Examination of Water and Wastewater.
 - 3. Obtain and analyze a minimum of two Samples on each of 2 consecutive days from every 1,000 feet of pipeline by standard procedures outlined by state and local regulatory agencies.
 - 4. Sampling points shall be representative and accepted by Engineer.

JACKSONVILLE PORT AUTHORITY
BLOUNT ISLAND EQUIPMENT WASH FACILITY

- E. Turbidity Sampling and Analysis:
1. After pipelines have been cleaned, disinfected, and refilled with potable water, Owner will take water Samples and have them analyzed for conformance to turbidity limitations for public drinking water supplies. Turbidity shall not exceed 0.3 NTU.
 2. If turbidity is in excess of the limit, dispose of the water in accordance with this Specification and applicable regulations, take action to remove source of turbidity, refill system, and retest.
- F. If minimum Samples required above are bacterially positive, disinfecting procedures and bacteriological testing shall be repeated until bacterial limits are met.

END OF SECTION