CONTRACT DOCUMENTS FOR:

ITB # 17-018

SMATHERS BEACH BATHROOM

JUNE 2017

MAYOR: CRAIG CATES

COMMISSIONERS:

RICHARD PAYNE

BILLY WARDLOW

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PREPARED BY:
City of Key West
Engineering Services

CITY OF KEY WEST

KEY WEST, FLORIDA

CONTRACT DOCUMENTS

For

SMATHERS BEACH BATHROOM

****

CONSISTING OF:
BID REQUIREMENTS
CONTRACT FORMS
CONDITIONS OF THE CONTRACT
GENERAL REQUIREMENTS
DRAWINGS

*****

KEY WEST, FLORIDA

JUNE 2017

Table of Contents

DIVISION 8 – OPENINGS

081113	HOLLOW METAL DOORS AND FRAMES
087100	DOOR HARDWARE

DIVISION 9 – FINISHES

092236	METAL LATH
092400	PORTLAND CEMENT PLASTERING
099113	EXTERIOR PAINTING

DIVISION 22 – PLUMBING

220500	COMMON WORK RESULTS FOR PLUMBING
224900	PREFABRICATED MODULAR BATHROOMS

DIVISION 26 – ELECTRICAL

260010	BASIC ELECTRICAL GROUND REQUIREMENTS
260023	CODES & STANDARD
260526	GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
260529	HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS
260533	RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS
260543	UNDERGROUND DUCTS AND RACEWAYS
260553	IDENTIFICATION FOR ELECTRICAL SYSTEMS
262416	PANELBOARDS
262726	WIRING DEVICES
262816	ENCLOSED SWITCHES AND CIRCUIT BREAKERS
264113	LIGHTNING PROTECTION SYSTEM

PART 6 - DRAWINGS

SMATHERS BEACH BATHROOM ..... G000 – E-02

PART 7- FDOT UTILITY PERMIT

FLORIDA DEPARTMENT OF TRANSPORTATION UTILITY PERMIT

PART 8 - REPORTS, ANALYSIS & CODES

NUTTING GEOTECHNICAL REPORT / CB&I COASTAL ENGINEERING ANALYSIS / KEY WEST CITY ORDINANCE SEC.34-133

PART 1

BIDDING REQUIREMENTS

INVITATION TO BID

Sealed bids for the City of Key West ITB # 17-018 SMATHERS BEACH BATHROOM, addressed to the City of Key West, will be received at the Office of the City Clerk, 1300 White Street., Key West Florida, 33040 until 3:00 p.m. on Wednesday, July 26, 2017 and then will be publicly opened and read. Any bids received after the time and date specified will not be considered.

Please submit one (1) original, and two (2) flash drives each with one single PDF file of the sections entitled "Bidding Requirements" and "Contract Forms". Bid package is to be enclosed in a sealed envelope, clearly marked on the outside "ITB #17-018 BID FOR SMATHERS BEACH BATHROOM" addressed and delivered to the City Clerk at the address noted above.

The project contemplated consists of providing all site work, materials, equipment and labor necessary to accomplish the following:

Furnish and install a bathroom facility as shown on "SMATHERS BEACH BATHROOM" drawings. Including a sewer lift station and South Roosevelt road crossing.

Drawings and Specifications may be obtained from Demand Star by Onvia or City of Key West. Please contact Demand Star at www.demandstar.com or call 1-800-711-1712 or www.cityofkeywest-fl.gov

A Pre - Bid meeting will be held on July 12, 2017 at 11 a.m. in Room 113 Key West City Hall 1300 White Street, Key West, Florida

EACH BID MUST BE SUBMITTED ON THE PRESCRIBED FORM AND ACCOMPANIED BY BID SECURITY AS PRESCRIBED IN THE INSTRUCTIONS TO BIDDERS, PAYABLE TO THE CITY OF KEY WEST, FLORIDA, IN AN AMOUNT NOT LESS THAN FIVE (5) PERCENT OF THE AMOUNT BID.

THE BIDDER MUST BE A LICENSED CONTRACTOR BY THE STATE OF FLORIDA AND SUBMIT PROOF OF SUCH WITH THE BID.

The successful Bidder shall furnish documentation showing that he is in compliance with the licensing requirements of the State and the provisions of Chapter 66 Section 87 of the Code of Ordinances of the City of Key West; within 10 days following the Notice of Award and must demonstrate that he holds at a minimum, the following licenses & certificates;

A. City of Key West Business Tax License Receipt
B. A valid Certificate of Competency issued by the Chief Building Official of Key West, Florida.

All bid bonds, insurance contracts, and certificates of insurance shall be either executed by or countersigned by a licensed resident agent of the Surety or Insurance Company having his place of business in the State of Florida, and in all ways complying with the insurance laws of the State of Florida. Further, the said Surety or Insurance Company shall be duly licensed and qualified to do business in the State of Florida.

Before a Contract will be awarded for the work contemplated herein, the CITY will conduct such investigation as is necessary to determine the performance record and ability of the apparent low Bidder to perform the size and type of work specified under this Contract. Upon request, the Bidder shall submit such information as deemed necessary by the CITY to evaluate the Bidder's qualifications.

Any request for information concerning this project must be made in writing, per City of Key West Ordinance Section 2-773, Cone of Silence, to Janet Muccino, Project Manager, at jmuccino@cityofkeywest-fl.gov.

As stated above at the time of the bid submittal the Bidder must provide satisfactory documentation of State Licenses. The Bidder shall furnish documentation showing that he is in compliance with the licensing requirements of County, and City licenses as would be required within ten days of the award. The successful Bidder must also be able to satisfy the CITY Attorney as to such insurance coverage and legal requirements as may be demanded by the Bid in question. The CITY may reject bids for any and/or all of the following reasons: (1) for budgetary reasons, (2) if the bidder misstates or conceals a material fact in its bid, (3) if the bid does not strictly conform to the law or is non-responsive to the bid requirements, (4) if the bid is conditional, or (5) if a change of circumstances occurs making the purpose of the bid unnecessary to the CITY. The CITY may also waive any minor formalities or irregularities in any bid, (6) if such rejection is in the best interest of the CITY.

INSTRUCTIONS TO BIDDERS

1. CONTRACT DOCUMENTS

A. FORMAT

The Contract Documents are divided into parts, divisions, and sections for convenient organization and reference. Generally, there has been no attempt to divide the sections into work performed by the various building trades, work by separate subcontractors, or work required for separate facilities in the project.

B. DOCUMENT INTERPRETATION

The separate sections contained within these Contract Documents are intended to be mutually cooperative and to provide all details reasonably required for the execution of the proposed work.

Should there be any doubt as to the meaning or intent of said Contract Documents, the Bidder should request of the ENGINEER, in writing (at least ten (10) calendar days prior to bid opening) an interpretation thereof. Any interpretation or change in said Contract Documents will be made only in writing in the form of Addenda to the documents which will be available to all registered holders of Contract Documents via Demand star. Bidders shall submit with their Bids, or indicate receipt of, all Addenda. The CITY will not be responsible for any other explanation or interpretations of said Documents.

2. GENERAL DESCRIPTION OF THE PROJECT

A general description of the work to be done is contained in the Invitation to Bid. The scope is specified in applicable parts of these Contract Documents.

3. QUALIFICATION OF CONTRACTORS

The prospective Bidders must meet the statutorily prescribed requirements before award of Contract by the CITY. Bidders must hold or obtain all licenses and/or certificates as required by the State and Local Statutes to bid and perform the work specified herein.

4. BIDDER'S UNDERSTANDING

Each Bidder must inform himself of the conditions relating to the execution of the work, and it is assumed that he will inspect the site and make himself thoroughly familiar with all the Contract Documents. Failure to do so will not relieve the successful Bidder of his obligation to enter a Contract and complete the contemplated work in strict accordance with the Contract Documents. It shall be the Bidder's obligation to verify for himself and to his complete satisfaction all information concerning site and subsurface conditions.

The CITY will make available to prospective Bidders upon request and at the office of the ENGINEER, prior to bid opening, any information that he may have as to subsurface conditions

and surface topography at the worksite.

Each Bidder shall inform himself of, and the Bidder awarded a Contract shall comply with, federal, state, and local laws, statutes, and ordinances relative to the execution of the work. This requirement includes, but is not limited to, applicable regulations concerning minimum wage rates, nondiscrimination in the employment of labor, protection of public and employee safety and health, environmental protection, the protection of natural resources, fire protection, burning and non-burning requirements, permits, fees, and similar subjects.

5. TYPE OF BID

A. LUMP SUM

The BID for the work is to be submitted on a lump sum basis. Lump sum prices shall be submitted for all items of work set forth in the bid. All items required to complete the work specified but not included in the bid shall be considered incidental to those set forth in the bid.

The Bidder shall submit a Schedule of Values with the BID. It shall be broken down by trade and type of work and include the cost of all LABOR & MATERIALS for use as a basis for payment.

6. PREPARATION OF BIDS

A. GENERAL

All blank spaces in the BID form must be filled in, as required, preferably in BLACK ink. All price information shall be shown in both words and figures where required. No changes shall be made in the phraseology of the forms. Written amounts shall govern in case of discrepancy between the amounts stated in writing and the amounts stated in figures. In case of discrepancy between unit prices and extended totals, unit prices shall prevail.

Any BID shall be deemed informal which contains omissions, erasures, alterations, or additions of any kind, or prices uncalled for, or in which any of the prices are obviously unbalanced, or which in any manner shall fail to conform to the conditions of the published Invitation to Bid.

Only one BID from any individual, firm, partnership, or corporation, under the same or different names, will be considered. Should it appear to the CITY that any Bidder is interested in more than one Bid for work contemplated; all Bids in which such Bidder is interested will be rejected.

B. SIGNATURE

The Bidder shall sign his BID in the blank space provided therefore. If Bidder is a corporation, the legal name of the corporation shall be set forth above, together with the

signature of the officer or officers authorized to sign Contracts on behalf of the corporation. If Bidder is a partnership, the true name of the firm shall be set forth above, together with the signature of the partner or partners authorized to sign Contracts in behalf of the partnership. If signature is by an agent, other than an officer of a corporation or a member of a partnership, a notarized power-of-attorney must be on file with the CITY prior to opening of Bids or submitted with the Bid, otherwise the Bid will be regarded as not properly authorized.

C. SPECIAL BIDDING REQUIREMENTS

The Bidder's attention is brought to the hiring practices and licenses and permits of the City of Key West. These are defined in the addition to Article 39, ORDINANCES, PERMITS, AND LICENSES, as set forth in the Supplementary Conditions.

The Bidder shall submit with his Bid his experience record showing his experience and expertise in roof construction and related work. Such experience record shall provide at least five current or recent projects (within the past 5 years) of similar work, within the State Florida and preferably Monroe County. For each project the following information shall be provided:

1. Description and location of work.
2. Contract amount.
3. Dates work was performed.
4. Owner.
5. Name of Owner's contact person and phone number.
6. ENGINEER.
7. Name of ENGINEER's contact person and phone number.

The bidder shall submit with his bid a list of items to be performed by his own labor and that performed by subcontractors or others.

D. ATTACHMENTS

Bidder shall complete and submit the following forms with his bid:

Anti-Kickback Affidavit
Public Entity Crimes Form
Indemnification Form
City of Key West Business License Tax Receipt
Local Vendors Form
Domestic Partnership Affidavit
Cone of Silence Affidavit
Bidders' Checklist

E. PUBLIC ENTITY CRIMES FORM

Pursuant to the requirements of Chapter 287.133, Laws of Florida, pertaining to the sworn

statement on Public Entity Crimes and the Convicted Vendor List, all Bidders shall submit a signed and notarized statement with their Bid on the form provided herein.

7. STATE AND LOCAL SALES AND USE TAXES

Unless the Supplementary Conditions contains a statement that the CITY is exempt from state sales tax on materials incorporated into the work due to the qualification of the work under this Contract, the Contractor, as required by the laws and statutes of the state and its political subdivisions, shall pay all state and local sales and use taxes. Prices quoted in the Bid shall include all nonexempt sales and use taxes, unless provision is made in the Bid form to separately itemize the tax.

8. SUBMISSION OF BIDS

All BIDS must be submitted not later than the time prescribed, at the place, and in the manner set forth in the Invitation to Bid. BIDS must be made on the BID forms provided herewith, **submit one (1) ORIGINAL and two (2) FLASH DRIVES each containing a single PDF file of the entire bid package.**

Each BID must be submitted in a sealed envelope, so marked as to indicate the Bidder's name and its contents (project name and number) without being opened, and addressed in conformance with the instructions in the Invitation to Bid.

9. MODIFICATION OR WITHDRAWAL OF BIDS

Prior to the time and date designated for receipt of BIDS, any BID submitted may be withdrawn by notice to the party receiving BIDS at the place designated for receipt of BIDS. Such notice shall be in writing over the signature of the Bidder or by telegram. If by telegram, written confirmation over the signature of the Bidder shall be mailed and postmarked on or before the date and time set for receipt of BID. No BID may be withdrawn after the time scheduled for opening of BIDS, unless the time specified in paragraph AWARD OF CONTRACT of these Instructions to Bidders shall have elapsed.

10. BID SECURITY

BIDS must be accompanied by cash, a certified check, or cashier's check drawn on a bank in good standing, or a bid bond issued by a Surety authorized to issue such bonds in the state where the work is located, in the amount of five (5) percent of the total amount of the Bid submitted. This bid security shall be given as a guarantee that the Bidder will not withdraw his BID for a period of ninety (90) days after bid opening, and that if awarded the Contract, the successful Bidder will execute the attached Contract and furnish properly executed Performance and Payment Bonds, each in the full amount of the Contract price within the time specified. Agent and Surety phone numbers must be provided.

The Attorney-in-Fact who executes this bond in behalf of the Surety must attach a notarized copy of his power-of-attorney as evidence of his authority to bind the Surety on the date of execution of the bond. Where State Statute requires, certification by a resident agent shall also be provided.

If the Bidder elects to furnish a Bid Bond, he shall use the Bid Bond form bound herewith, or one conforming substantially thereto in form and content.

11. RETURN OF BID SECURITY

Within 15 days after the award of the Contract, the CITY will return the bid securities to all Bidders whose BIDS are not to be further considered in awarding the Contract. Retained bid securities will be held until the Contract has been finally executed, after which all bid securities, other than Bidders' bonds and any guarantees, which have been forfeited, will be returned to the respective Bidders whose Bids they accompanied.

12. AWARD OF CONTRACT

Within ninety (90) calendar days after the opening of Bids, the CITY will accept one of the Bids or will act in accordance with the following paragraphs. The acceptance of the Bid will be by written notice of award, mailed to the office designated in the Bid, or delivered to the Bidder's representative. In the event of failure of the lowest responsive, responsible Bidder to sign the Contract, provide additional documents, insurance certificate(s) and evidence of holding required licenses and certificates, the Owner may award the Contract to the next lowest responsive, responsible Bidder. Such award, if made, will be made within one hundred & twenty (120) days after the opening of Bids.

The CITY reserves the right to accept or reject any or all Bids, and to waive any informalities and irregularities in said Bids.

13. BASIS OF AWARD

The award will be made by the Owner on the basis of the BID from the lowest, responsive, responsible BIDDER which, in the Owner's sole and absolute judgment will best serve the interest of the Owner.

14. EXECUTION OF CONTRACT

The successful Bidder shall, within ten (10) working days after receiving Notice of Award, sign and deliver to the CITY an original Contract and two (2) copies in the form hereto attached, together with the insurance certificate as required in the Contract Documents and evidence of holding required licenses and certificates. Within 10 working days after receiving the signed Contract from the successful Bidder, the City's authorized agent will sign the Contract. Signature by both parties constitutes execution of the Contract.

16. FAILURE TO EXECUTE CONTRACT AND FURNISH BID BOND

The Bidder who has a Contract awarded to him and who fails to promptly and properly execute the Contract shall forfeit the bid security that accompanied his bid, and the bid security shall be retained as liquidated damages by the CITY, and it is agreed that this said sum is a fair estimate of the amount of damages the CITY will sustain in case the Bidder fails to enter into a Contract. Bid

security deposited in the form of cash, a certified check, or cashier's check shall be subject to the same requirement as a Bid Bond.

17. TIME OF COMPLETION

The time of completion of the work to be performed under this Contract is the essence of the Contract. Delays and extensions of time may be allowed in accordance with the provisions stated in the General Conditions.

When the Contractor receives a Notice to Proceed, he shall commence work as soon as possible and shall complete all work within the number of calendar days stipulated in this Bid.

The term of this contract will be **180** calendar days.

NOTE TO BIDDER: Use preferably BLACK ink for completing this BID form.

PROPOSAL FORM

To: The City of Key West

Address: 1300 White Street, Key West, Florida 33040

Project Title: SMATHERS BEACH BATHROOM
ITB 17-018

Bidder's contact person for additional information on this BID:

Company Name: _____

Contact Name & Telephone #: _____

Email Address: _____

BIDDER'S DECLARATION AND UNDERSTANDING

The undersigned, hereinafter called the Bidder, declares that the only persons or parties interested in this Bid are those named herein, that this Bid is, in all respects, fair and without fraud, that it is made without collusion with any official of the Owner, and that the Bid is made without any connection or collusion with any person submitting another Bid on this Contract.

The Bidder further declares that he has carefully examined the Contract Documents for the construction of the project, that he has personally inspected the site, that he has satisfied himself as to the quantities involved, including materials and equipment, and conditions of work involved, including the fact that the description of the quantities of work and materials, as included herein, is brief and is intended only to indicate the general nature of the work and to identify the said quantities with the detailed requirements of the Contract Documents, and that this Bid is made according to the provisions and under the terms of the Contract Documents, which Documents are hereby made a part of this Bid.

CONTRACT EXECUTION

The Bidder agrees that if this Bid is accepted, he will, within 10 days, not including Sundays and legal holidays, after Notice of Award, sign the Contract in the form annexed hereto, and will at that time, deliver to the Owner evidence of holding required licenses and certificates, and will, to the extent of his Bid, furnish all machinery, tools, apparatus, and other means of construction and do the work and furnish all the materials necessary to complete all work as specified or indicated in the Contract Documents.

CERTIFICATES OF INSURANCE

Bidder agrees to furnish the Owner, before commencing the work under this Contract, the certificates of insurance as specified in these Documents.

START OF CONSTRUCTION AND CONTRACT COMPLETION TIME

The Bidder further agrees to begin work within 10 calendar days after the date of the Notice to proceed and to complete the project, in all respects within 180 calendar days after the date of the Notice to Proceed.

LIQUIDATED DAMAGES

In the event the Bidder is awarded the Contract and shall fail to complete the work within the time limit or extended time limit agreed upon, as more particularly set forth in the Contract Documents, liquidated damages shall be paid to the Owner at the rate of $250.00 per day for all work awarded until the work has been satisfactorily completed as provided by the Contract Documents.

ADDENDA

The Bidder hereby acknowledges that he has received Addenda No's. _____, _____,
____, _____, ____, ____, _____, _____, _____, _____, _____, _____,
(Bidder shall insert No. of each Addendum received) and agrees that all addenda issued are hereby made part of the Contract Documents, and the Bidder further agrees that his Bid(s) includes all impacts resulting from said addenda.

SALES AND USE TAXES

The Bidder agrees that all federal, state, and local sales and use taxes are included in the stated bid prices for the work.

LUMP SUM

The Bidder further proposes to accept as full payment for the work proposed herein the amounts computed under the provisions of the Contract Documents and based on the following lump sum amounts. The Bidder agrees that the lump sum represent a true measure of the labor and materials required to perform the work, including all allowances for overhead and profit for each type and unit of work called for in these Contract Documents.

PROPOSAL FORM

1.) **BATHROOM LUMP SUM BASE BID:**
(Includes all permitting, fixtures, equipment, material & labor)

LUMP SUM $ _____

_____ Dollars & _____ Cents
(amount written in words)

2.) **SEWER LIFT STATION**
(Includes all permitting, road crossing, maintenance of traffic, equipment, material & labor)

LUMP SUM $ _____

_____ Dollars & _____ Cents
(amount written in words)

TOTAL LUMP SUM BID ITEMS 1 & 2

LUMP SUMS $ _____

_____ Dollars & _____ Cents
(amount written in words)

BID ALTERNATE NO. 1 - SITE CONSTRUCTED BATHROOM

Bidders have the option (not required) to provide lump sum add or deduct price to Bid Item 1. for design-build of an on-site constructed bathroom in lieu of specified modular unit. Primary construction material shall be concrete masonry unit (CMU). Contractor to provide supporting design and permit/construction drawings signed/sealed by Florida Licensed Professional Engineer verifying proposed structure meets all applicable State of Florida and Key West Building Codes including wind and flood. Foundation, dimension, fixtures and finishes shall be consistent with those specified in the Bid Drawings and technical specifications. Contractor responsible for obtaining all required permits at no additional cost to the City.

LUMP SUM (Add+; Deduct-) $_____

Payment for materials & equipment authorized by the Owner in a written Change Order but not listed in the Schedule of Values will be provided at suppliers' invoice plus 15 %.

List items to be performed by CONTRACTOR's own forces and the estimated total cost of these items. (Use additional sheets if necessary.)

SUBCONTRACTORS

The Bidder further proposes that the following subcontracting firms or businesses will be awarded subcontracts for the following portions of the work if the Bidder is awarded the Contract:

_____
Name

_____, _____, _____, _____
Street City State Zip

Name

_____, _____, _____ ,_____
Street City State Zip

_____
Name

_____, _____, _____,_____
Street City State Zip

_____
Name

_____, _____, _____,_____
Street City State Zip

SURETY

_____ whose address is

_____, _____, _____, _____
Street City State Zip

BIDDER

The name of the Bidder submitting this Bid is

_____ doing business at

_____, _____, _____, _____
Street City State Zip

which is the address to which all communications concerned with this Bid and with the Contract shall be sent.

The names of the principal officers of the corporation submitting this Bid, or of the partnership, or of all persons interested in this Bid as principals are as follows:

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

If Sole Proprietor or Partnership

IN WITNESS hereto the undersigned has set his (its) hand this _____ day of _____ 2017.

_____
Signature of Bidder

_____
Title

If Corporation

IN WITNESS WHEREOF the undersigned corporation has caused this instrument to be executed and its seal affixed by its duly authorized officers this _____ day of _____ 2017.

(SEAL)

_____
Name of Corporation

By _____

Title _____
Attest_____
Secretary

EXPERIENCE OF BIDDER

The Bidder states that he is an experienced CONTRACTOR and has completed similar projects within the last 5 years.

(List similar projects, with types, names of OWNERs, construction costs, ENGINEERs, and references with phone numbers. Use additional sheets if necessary.

FLORIDA BID BOND

BOND NO. _____

AMOUNT: $ _____

KNOW ALL MEN BY THESE PRESENTS, that _____

_____

hereinafter called the PRINCIPAL, and _____

_____

a corporation duly organized under the laws of the State of _____

having its principal place of business at _____

_____in the State of _____,

and authorized to do business in the State of Florida, as SURETY, are held and firmly bound unto

_____

hereinafter called the OBLIGEE, in the sum of_____

DOLLARS ($_____) for the payment for which we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these present.

THE CONDITION OF THIS BOND IS SUCH THAT:

WHEREAS, the PRINCIPAL is herewith submitting his or its Bid for

ITB # 17-018 / SMATHERS BEACH BATHROOM / IS72011602 said Bid, by reference thereto, being hereby made a part hereof.

WHEREAS, the PRINCIPAL contemplates submitting or has submitted a bid to the OBLIGEE for the furnishing of all labor, materials (except those to be specifically furnished by the CITY), equipment, machinery, tools, apparatus, means of transportation for, and the performance of the work covered in the Bid and the detailed Specifications, entitled:

ITB 17-018 / SMATHERS BEACH BATHROOM / IS72011602

WHEREAS, it was a condition precedent to the submission of said bid that a cashier's check, certified check, or bid bond in the amount of five (5) percent of the base bid be submitted with said bid as a guarantee that the Bidder would, if awarded the Contract, enter into a written Contract with the CITY for the performance of said Contract, within 10 working days after written notice having been given of the award of the Contract.

NOW, THEREFORE, the conditions of this obligation are such that if the PRINCIPAL within 10 consecutive calendar days after written notice of such acceptance, enters into a written Contract with the OBLIGEE and furnishes the Performance and Payment Bonds**,** each in an amount equal to 100 percent of the base bid, satisfactory to the CITY, then this obligation shall be void; otherwise the sum herein stated shall be due and payable to the OBLIGEE and the Surety herein agrees to pay said sum immediately upon demand of the OBLIGEE in good and lawful money of the United States of America, as liquidated damages for failure thereof of said PRINCIPAL.

Signed and sealed this _____ day of _____ ,2017.

PRINCIPAL

By_____

STATE OF _____)
: SS
COUNTY OF _____)

_____
SURETY

By _____

ANTI – KICKBACK AFFIDAVIT

STATE OF _____)
: SS
COUNTY OF _____)

I, the undersigned hereby duly sworn, depose and say that no portion of the sum herein bid will be paid to any employees of the City of Key West as a commission, kickback, reward or gift, directly or indirectly by me or any member of my firm or by an officer of the corporation.

By: _____

Sworn and subscribed before me this _____day of _____, 2017.

NOTARY PUBLIC, State of _____ at Large

My Commission Expires:

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

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

1. This sworn statement is submitted with Bid or Bid for _____

   _____

2. This sworn statement is submitted by _____
   (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 _____

3. My name is _____
   (Please print name of individual signing)

   and my relationship to the entity named above is _____

4. 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 with the United States, including but not limited to, any bid or contract for goods or services to be provided to any public or an agency or political subdivision of any other state or of the United States and involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, material misrepresentation.

5. 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 guilt, in any federal or state trial court of record relating to charges brought by indictment information after July 1, 1989, as a result of a jury verdict, nonjury trial, or entry of a plea of guilty or nolo contendere.

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

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

    b. 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 management of an affiliate. The ownership by one person of shares constituting controlling 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.

7. I understand that a "person" as defined in Paragraph 287.133(1)(8), 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 public entity. The term "person" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in management of an entity.

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

    ____Neither the entity submitting this sworn statement, nor any officers, directors, executives, partners, shareholders, employees, members, or agents who are active in management of the entity, nor any affiliate of the entity have been charged with and convicted of a public entity crime subsequent to July 1, 1989, AND (Please indicate which additional statement applies.)

    _____There has been a proceeding concerning the conviction before a hearing of the State of Florida, Division of Administrative Hearings. The final order entered by the hearing officer did not place the person or affiliate on the convicted vendor list. (Please attach a copy of the final order.)

    _____The person or affiliate was placed on the convicted vendor list. There has been a subsequent proceeding before a hearing officer of the State of

    Florida, Division of Administrative Hearings. The final order entered by the hearing officer determined that it was in the public interest to remove the person or affiliate from the convicted vendor list. (Please attach a copy of the final order.)

_____The person or affiliate has not been put on the convicted vendor list. (Please describe any action taken by or pending with the Department of General Services.)

_____
(Signature)

_____
(Date)

STATE OF_____

COUNTY OF_____

PERSONALLY, APPEARED BEFORE ME, the undersigned authority,

_____who, after first being sworn by me, affixed his/her
(Name of individual signing)

Signature in the space provided above on this_____day of _____ , 2017.

My commission expires:

_____
NOTARY PUBLIC

INDEMNIFICATION

To the fullest extent permitted by law, the CONTRACTOR expressly agrees to indemnify and hold harmless the City of Key West, their officers, directors, agents, and employees (herein called the "indemnitees") from liabilities, damages, losses and costs, including, but not limited to, reasonable attorney's fees and court costs, such legal expenses to include costs incurred in establishing the indemnification and other rights agreed to in this Paragraph, to persons or property, to the extent caused by the negligence, recklessness, or intentional wrongful misconduct of the CONTRACTOR, its Subcontractors or persons employed or utilized by them in the performance of the Contract. Claims by indemnitees for indemnification shall be limited to the amount of CONTRACTOR's insurance or $1 million per occurrence, whichever is greater. The parties acknowledge that the amount of the indemnity required hereunder bears a reasonable commercial relationship to the Contract and it is part of the project specifications or the bid documents, if any.

The indemnification obligations under the Contract shall not be restricted in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the CONTRACTOR under workers' compensation acts, disability benefits acts, or other employee benefits acts, and shall extend to and include any actions brought by or in the name of any employee of the CONTRACTOR or of any third party to whom CONTRACTOR may subcontract a part or all of the Work. This indemnification shall continue beyond the date of completion of the work.

CONTRACTOR: _____ SEAL:

_____
Address

_____
Signature

_____
Print Name

_____
Title

DATE: _____

LOCAL VENDOR CERTIFICATION PURSUANT TO CKW ORDINANCE 09-22 SECTION 2-798

The undersigned, as a duly authorized representative of the vendor listed herein, certifies to the best of his/her knowledge and belief, that the vendor meets the definition of a "Local Business." For purposes of this section, "local business" shall mean a business which:

a. Principle address as registered with the FL Department of State located within 30 miles of the boundaries of the city, listed with the chief licensing official as having a business tax receipt with its principle address within 30 miles of the boundaries of the city for at least one year immediately prior to the issuance of the solicitation.

b. Maintains a workforce of at least 50 percent of its employees from the city or within 30 miles of its boundaries.

c. Having paid all current license taxes and any other fees due the city at least 24 hours prior to the publication of the call for bids or request for Bids.

- Not a local vendor pursuant to Ordinance 09-22 Section 2-798
- Qualifies as a local vendor pursuant to Ordinance 09-22 Section 2-798

If you qualify, please complete the following in support of the self-certification & submit copies of your County and City business licenses. Failure to provide the information requested will result in denial of certification as a local business.

Business Name _____ Phone: _____

Current Local Address: _____ Fax:_____
(P.O Box numbers may not be used to establish status)

Length of time at this address:_____

_____ Date: _____
Signature of Authorized Representative

STATE OF_____ COUNTY OF_____

The foregoing instrument was acknowledged before me this _____day of_____, 2017.

By_____, of _____
(Name of officer or agent, title of officer or agent) (Name of corporation acknowledging)

or has produced identification_____as identification
(Type of identification)

_____
Signature of Notary

_____
Print, Type or Stamp Name of Notary

Return Completed form with
Supporting documents to:
City of Key West Purchasing

_____
Title or Rank

EQUAL BENEFITS FOR DOMESTIC PARTNERS AFFIDAVIT

STATE OF _____)
: SS
COUNTY OF _____)

I, the undersigned hereby duly sworn, depose and say that the firm of _____ provides benefits to domestic partners of its employees on the same basis as it provides benefits to employees' spouses per City of Key West Ordinance Sec. 2-799.

By: _____

Sworn and subscribed before me this

_____ Day of _____, 2017.

_____

NOTARY PUBLIC, State of _____ at Large

My Commission Expires: _____

CONE OF SILENCE AFFIDAVIT

STATE OF _____)
: SS
COUNTY OF _____)

I the undersigned hereby duly sworn depose and say that all owner(s), partners, officers, directors, employees and agents representing the firm of _____ have read and understand the limitations and procedures regarding communications concerning City of Key West issued competitive solicitations pursuant to City of Key West Ordinance Section 2-773 Cone of Silence.

Sworn and subscribed before me this

_____ Day of _____, 2017.

_____

NOTARY PUBLIC, State of _____ at Large

My Commission Expires: _____

BIDDER'S CHECKLIST

(Note: The purpose of this checklist is to serve as a reminder of major items to be addressed in submitting a bid and is not intended to be all inclusive. It does not alleviate the Bidder from the responsibility of becoming familiar with all aspects of the Contract Documents and proper completion and submission of his bid.)

1.	All Contract Documents thoroughly read and understood.	[ ]
2.	All blank spaces in Bid filled in, using black ink.	[ ]
3.	Total and unit prices added correctly and attached Schedule of Values	[ ]
4.	Addenda acknowledged.	[ ]
5.	Subcontractors are named as indicated in the Bid.	[ ]
6.	Experience record included.	[ ]
7.	Bid signed by authorized officer.	[ ]
8.	Bid Bond completed and executed, including power-of-attorney dated the same date as Bid Bond.	[ ]
9.	Bidder familiar with federal, state, and local laws, ordinances, rules and regulations affecting performance of the work.	[ ]
10.	Bidder, if successful, able to obtain and/or demonstrate possession of required licenses and certificates within (10) ten calendar days after receiving a Notice of Award.	[ ]
11.	BID submitted intact with the volume entitled “Bidding Requirements” and “Contract Forms”, 1 original, and 2 flash drives as stated in the invitation to bid.	[ ]
12.	Bid Documents submitted in sealed envelope and addressed and labeled in conformance with the instructions in the Invitation to Bid.	[ ]

PART 2

CONTRACT FORMS

CONTRACT

This Contract, made and entered into this _____ day of _____ 2017,

by and between the CITY OF KEY WEST, hereinafter called the "Owner", and_____

_____

hereinafter called the "Contractor";

WITNESSETH:

The Contractor, in consideration of the sum to be paid him by the Owner and of the covenants and agreements herein contained, hereby agrees at his own proper cost and expense to do all the work and furnish all the materials, tools, labor, and all appliances, machinery, and appurtenances for ITB 17-018 SMATHERS BEACH BATHROOM, Key West, Florida to the extent of the Bid made by the Contractor, dated the _____ th day of_____2017, all in full compliance with the Contract Documents referred to herein.

The CONTRACT DOCUMENTS, including the signed copy of the BID, BID BOND, CONTRACT FORM, SUMMARY OF WORK, SPECIFICATIONS, DRAWINGS, GENERAL & SUPPLEMENTARY CONDITIONS OF THE CONTRACT.

In consideration of the performance of the work as set forth in these Contract Documents, the Owner agrees to pay to the Contractor the amount bid in the Bid as adjusted in accordance with the Contract Documents, or as otherwise herein provided, and to make such payments in the manner and at the times provided in the Contract Documents.

The Contractor agrees to complete the work within One hundred & eighty (180) days and to accept as full payment hereunder the amounts computed as determined by the Contract Documents and based on the said BID.

The Contractor agrees to remedy all defects appearing in the work or developing in the materials furnished and the workmanship performed under this Contract during the warranty period after the date of final acceptance of the work by the Owner, and further agrees to indemnify and save the Owner harmless from any costs encountered in remedying such defects.

It is agreed that the Contract, based upon the BID, shall be fully complete within the stated number of consecutive calendar days from the date the Notice to Proceed is issued.

In the event the Contractor fails to complete the work within the time limit or extended time limit agreed upon, as more particularly set forth in the Contract Documents, liquidated damages shall be paid at a rate of $250.00 per day. Sundays and legal holidays shall be included in determining days in default.

This contract will automatically expire upon completion of the project. Contractors warranty obligations remain in effect.

IN WITNESS WHEREOF, we, the parties hereto, each herewith subscribe the same this

_____ Day of _____, A.D., 2017.

CITY OF KEY WEST

By_____

Title City Manager

CONTRACTOR

By_____

Title_____

FLORIDA PERFORMANCE BOND

BOND NO._____

AMOUNT: $_____

KNOW ALL MEN BY THESE PRESENTS, that in accordance with Florida Statutes Section 255.05, _____

with offices, at _____

hereinafter called the CONTRACTOR, (Principal), and _____

with offices, at _____

a corporation duly organized and existing under and by virtue of the laws of the State of _____ , hereinafter called the SURETY, and authorized to transact business within the State of Florida, as SURETY, are held and firmly bound CITY OF KEY WEST**,**

represented by its _____, hereinafter called the City (Obligee), in the sum of:

_____DOLLARS ($_____), lawful money of the United States of America, for the payment of which, well and truly be made to the CITY, and the CONTRACTOR and the SURETY bind themselves and each of their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents as follows:

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH THAT:

WHEREAS, the CONTRACTOR has executed and entered into a certain Contract hereto attached, with the CITY, dated _____,2017, to furnish at his own cost, charges, and expense all the necessary materials, equipment, and/or labor in strict and express accordance with said Contract and the Contract Documents as defined therein, all of which is made a part of said Contract by certain terms and conditions in said Contract more particularly mentioned, which Contract, consisting of the various Contract Documents is made a part of this Bond as fully and completely as if said Contract Documents were set forth herein;

NOW THEREFORE, the conditions of this obligation are such that if the above bounden CONTRACTOR:

1. Shall in all respects comply with the terms and conditions of said Contract and his obligation there under, including the Contract Documents (which include the permit form, coral relocation plan, specifications, and conditions as prepared by the CITY, invitation to bid, instructions to bidders, the CONTRACTOR'S bid as accepted by the above CITY, the bid and contract performance and payment bonds, and all addenda, if any, issued prior to the opening of bids),

being made a part of this bond by reference, at the times and in the manner prescribed in the contract; and

2. Promptly makes payments to all claimants, as defined in Section 255.05(1), Florida Statutes, supplying PRINCIPAL with labor, materials, or supplies, used directly or indirectly by PRINCIPAL in the prosecution of the work provided for in the contract; and

3. Pays CITY all losses, costs, expenses, damages, attorney's fees, including appellate proceedings, injury or loss of whatever kind and however arising including, without limitation, delay damages to which said CITY may be subject by reason of any wrongdoing, misconduct, want of care or skill, negligence, failure of performance, breach, failure to petition within the prescribed time, or default, including patent infringements, on the part of said CONTRACTOR, his agents or employees, in the execution or performance of said Contract; and

4. Performs the guarantee of all work and materials furnished under the contract for the time specified in the contract, then this obligation shall be void; otherwise, to remain in full force and effect for the term of said Contract.

AND, the said Surety for value received, hereby stipulates and agrees that no change involving any extension of time, or addition to the terms of the Contract Documents, or to the work to be performed, or materials to be furnished there under shall affect said obligation of said Surety on this Bond, and the said Surety does hereby waive notice of any such changes, extension of time, alterations, or additions of the terms of the Contract Documents, or to the work.

Any action instituted by a claimant under this bond for payment must be in accordance with the notice and time limitation provisions in Section 255.05(2), Florida Statutes.

IN WITNESS WHEREOF, the above parties bonded together have executed this instrument this day of _____,2017, the name and corporate seal of each corporate party being hereto affixed and those presents duly signed by its undersigned representative, pursuant to authority of its governing body.

CONTRACTOR

_____

By:_____(Seal)

_____ Attest

SURETY

By _____(Seal)

_____ Attest

FLORIDA PAYMENT BOND

BOND NO_____

AMOUNT: $_____

KNOW ALL MEN BY THESE PRESENTS, that in accordance with Florida Statutes Section 255.05, _____

with offices at _____

hereinafter called the CONTRACTOR, (Principal), and

_____

with offices at _____

a corporation duly organized and existing under and by virtue of the laws of the State of _____ , hereinafter called the SURETY, and authorized to transact business within the State of Florida, as SURETY, are held and firmly bound CITY OF KEY WEST**,**

represented by its _____, hereinafter called the City (Obligee), in the sum of:

_____DOLLARS ($_____), lawful money of the United States of America, for the payment of which, well and truly be made to the CITY, and the CONTRACTOR and the SURETY bind themselves and each of their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents as follows:

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH THAT:

WHEREAS, the CONTRACTOR has executed and entered into a certain Contract for

SMATHERS BEACH BATHROOMS 2017

attached hereto, with the CITY, dated _____, 2017, to furnish at his own cost, charges, and expense the necessary materials, equipment, and/or labor in strict and express accordance with said Contract and the plans, drawings (if any), and specifications prepared by the CITY, all of which is made a part of said Contract by certain terms and conditions in said Contract more particularly mentioned, which Contract, consisting of the various Contract Documents specifically mentioned herein and relative hereto, is made a part of this Bond as fully and completely as if said Contract Documents were set forth herein.

NOW THEREFORE, the conditions of this obligation are such that if the above bounden CONTRACTOR shall in all respects comply with the terms and conditions of said Contract and his obligation thereunder, including the Contract Documents (which include the permit form, coral

relocation plan, the specifications, and conditions prepared by the CITY, invitation to bid, instructions to bidders, the CONTRACTOR'S bid as accepted by the CITY, the bid and contract and payment bonds, and all addenda, if any, issued prior to the opening of bids), and further that if said CONTRACTOR shall promptly make payments to all persons supplying materials, equipment, and/or labor, used directly or indirectly by said CONTRACTOR or SUBCONTRACTORs in the prosecution of the work for said contract is accordance with Florida Statutes, Section 255.05 or Section 713.23, then this obligation shall be void; otherwise to remain in full force and effect for the term of said contract, including and all guarantee periods as specifically mentioned in said Contract Documents.

AND, the said SURETY for value received, hereby stipulates and agrees that no change involving any extension of time, or addition to the terms of the Contract or to the work to be performed, or materials to be furnished thereunder, or in the Contract Documents and specifications accompanying the said contract shall affect said obligation of said SURETY on this Bond, and the said SURETY does hereby waive notice of any such changes, extension of time, alternations, or additions of the terms of the Contract, or to the work, to the Contract Documents, or to the specifications.

Claimant shall give written notice to the CONTRACTOR and the SURETY as required by Section 255.05 or Section 713.23, Florida Statutes. Any action instituted against the CONTRACTOR or SURETY under this bond for payment must be in accordance with the notice and time limitation provisions in Section 255.05(2) or Section 713.23, Florida Statutes.

IN WITNESS WHEREOF, the above parties bounded together have executed this instrument this _____ day of _____,2017, the name and corporate seal of each corporate party being hereto affixed and those presents duly signed by its undersigned representative, pursuant to authority of its governing body.

CONTRACTOR

_____

By:_____ (Seal)

_____

Attest

SURETY

By _____ (Seal)

_____

Attest

PART 3

CONDITIONS OF THE CONTRACT

GENERAL CONDITIONS
CONTENTS

Article

GENERAL CONDITIONS
CONTENTS

Article

PAYMENT

DEFINITIONS

Whenever in the Contract Documents the following terms are used, the intent and meaning shall be interpreted as follows:

1. AS APPROVED

The words "as approved", unless otherwise qualified, shall be understood to be followed by the words "by the ENGINEER for conformance with the Contract Document".

2. AS SHOWN, AND AS INDICATED

The words "as shown" and "as Indicated" shall be understood to be followed by the words "on the Drawings".

3. BIDDER

The person or persons, partnership, firm, or corporation submitting a Bid for the work contemplated.

4. CONTRACT DOCUMENTS

The "Contract Documents" consist of the Bidding Requirements, Contract Forms, Conditions of the Contact, Specifications, Drawings, all modifications thereof incorporated into the Documents before their execution, Change Orders, and all other requirements incorporated by specific reference thereto. These form the Contract.

5. CONTRACTOR

The person or persons, partnership, firm, or corporation who enters into the Contract awarded him by the OWNER.

6. CONTRACT COMPLETION

The "Contract Completion" is the date the OWNER accepts the entire work as being in compliance with the Contract Documents, or formally waives nonconforming work to extent of nonconformity, and issues the final payment in accordance with the requirements set forth in Article, "Final Payment" of these General Conditions.

7. DAYS

Unless otherwise specifically stated, the term "days" will be understood to mean calendar days. Business day or working day means any day other than Saturday, Sunday, or legal holiday.

8. DRAWINGS

The term "Drawings" refers to the official Drawings, Profiles, cross sections, elevations, details, and other working drawings and supplementary drawings, or reproductions thereof, signed by the ENGINEER, which shows the location, character, dimensions, and details of the work to be performed. Drawings may either be bound in the same book as the balance of the Contract Documents, or bound in separate sets, and are a part of the Contract Documents, regardless of the method of binding.

9. ENGINEER

The person or organization identified as such in the Contract Documents. The Term "ENGINEER" means ENGINEER or his authorized representative.

10. NOTICE

The term "notice" or the requirement to notify, as used in the Contract Documents or applicable state or federal statutes, shall signify a written communication delivered in person or by registered mail to the individual, or to a member of the firm, or to an officer of the corporation for whom it is intended. Certified or registered mail shall be addressed to the last business address known to him

who gives the notice.

11. OR EQUAL

The term "or equal" shall be understood to indicate that the "equal" Product is equivalent to or better than the Product named in function, performance, reliability, quality, and general configuration. Determination of equality in reference to the Project design requirements will be made by the ENGINEER. Such equal Products shall not be purchased or installed by the CONTRACTOR without written authorization.

12. OWNER

The person, organization, or public body identified as such in the Contract Documents.

13. PLANS (See Drawings)

14. SPECIFICATIONS

The term "Specifications" refers to those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards, and workmanship as applied to the work and certain administrative details applicable thereto. Where standard specifications, such as those of ASTM, AASHTO, etc., have been referred to, the applicable portions of such standard specifications shall become a part of these Contract Documents. If referenced specifications conflict with specifications contained herein, the requirements contained herein shall prevail.

15. NOTICE TO PROCEED

A written notice given by the OWNER to the CONTRACTOR (with a copy to the ENGINEER) fixing the date on which the Contract time will commence to run and on which the CONTRACTOR shall start to perform his obligation under the Contract Documents. The Notice to Proceed will be given within 30 days following the execution of the Contract by the OWNER.

16. SUBSTANTIAL COMPLETION

"Substantial Completion" shall be that degree of completion of the Project or a defined portion of the Project, as evidenced by the ENGINEER's written notice of Substantial Completion, sufficient to Provide the OWNER, at his discretion, the full-time use of the Project or defined portion of the Project for the purposes for which it was intended. "Substantial Completion" of an operating facility shall be that degree of completion that has Provided a minimum of 7 continuous days of successful, trouble-free, operation, which period shall begin after all performance and acceptance testing has been successfully demonstrated to the ENGINEER. All equipment contained in the work, plus all other components necessary to enable the OWNER to operate the facility in a manner that was intended, shall be complete on the substantial completion date.

17. WORK

The word "work" within these Contract Documents shall include all material, labor, tools, and all appliances, machinery, transportation, and appurtenances 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 item described or indicated and as required by good Practice to Provide a complete and satisfactory system or structure. As used herein, "Provide" shall be understood to mean "furnish and install, complete in-place ".

CONTRACT DOCUMENTS

18. INTENT OF CONTRACT DOCUMENTS

The Contract Documents are complementary, and what is called for by one shall be as binding as if called for by all. The intent of the Documents is to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any work, materials, or equipment that may reasonably be inferred from the Contract Documents as being required to produce the intended result shall be supplied whether or not specifically called for. When words which have a well-known technical

or trade meaning are used to describe work, materials, or equipment, such words shall be interpreted in accordance with that meaning.

Reference to standard specifications, manuals, or codes of any technical society, organization or association, or to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code or laws or regulations in effect on the first published date of the Invitation to Bid, except as may be otherwise specifically stated. However, no Provision of any referenced standard specification, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of OWNER, CONTRACTOR, or ENGINEER, or any of their consultants, agents, or employees from those set forth in the Contract Documents, nor shall it be effective to assign to ENGINEER, or any ENGINEER's consultants, agents, or employees, any duty or authority to supervise or direct the furnishing or performance of the work or any duty or authority to undertake responsibility contrary to the Provisions of Article LIMITATIONS ON ENGINEER'S RESPONSIBILITIES.

19. DISCREPANCIES AND OMISSIONS

Any discrepancies or omissions found in the Contract Documents shall be reported to the ENGINEER immediately. The ENGINEER will clarify discrepancies or omissions, in writing, within a reasonable time.

In resolving inconsistencies among two or more sections of the Contract Documents, Precedence shall be given in the following order:

A. CONTRACT
B. BID
C. SUPPLEMENTARY CONDITIONS
D. INVITATION TO BID
E. INSTRUCTIONS TO BIDDERS
F. GENERAL CONDITIONS
G. SPECIFICATIONS
H. DRAWINGS

Addenda shall take Precedence over all sections referenced therein. Figure dimensions on Drawings shall take precedence over scale dimensions. Detailed Drawings shall take precedence over general Drawings.

20. CHANGES IN THE WORK

The OWNER, without notice to the Sureties and without invalidating the Contract, may order changes in the work within the general scope of the Contract by altering, adding to, or deducting from the work, the Contract being adjusted accordingly. All such work shall be executed under the conditions of the original Contract, except as specifically adjusted at the time of ordering such change.

In giving instructions, the ENGINEER may order minor changes in the work not involving extra cost and not inconsistent with the purposes of the Project, but otherwise, except in an emergency endangering life and Property, additions or deductions from the work shall be performed only in pursuance of an approved Change Order from the OWNER, countersigned by the ENGINEER.

If the work is reduced by alterations, such action shall not constitute a claim for damages based on loss of anticipated Profits.

21. EXAMINATION AND VERIFICATION OF CONTRACT DOCUMENTS

The CONTRACTOR shall thoroughly examine and become familiar with all of the various parts of these Contract Documents and determine the nature and location of the work, the general and local conditions, and all other matters, which can in any way affect the work under this Contract. Failure to make an examination necessary for this determination shall not release the CONTRACTOR from the obligations of this Contract. No verbal agreement or conversation with any officer, agent, or employee of the OWNER or with the ENGINEER either before or after the execution of this Contract shall affect or modify any of the terms or obligations herein contained.

22. DOCUMENTS TO BE KEPT ON THE JOBSITE

The CONTRACTOR shall keep one copy of the Contract Documents on the job- site, in good order, available to the ENGINEER

and to his representatives.

The CONTRACTOR shall maintain on a daily basis at the jobsite, and make available to the ENGINEER on request, one current record set of the Drawings which have been accurately marked to indicate all modifications in the completed work that differ from the design information shown on the Drawings. Upon Substantial completion of the work, the CONTRACTOR shall give the ENGINEER one complete set of these marked up record Drawings.

23. ADDITIONAL CONTRACT DOCUMENTS

Copies of Contract Documents or Drawings may be obtained on request from the ENGINEER and by paying the actual cost of reproducing the Contract Documents or Drawings.

24. OWNERSHIP OF CONTRACT DOCUMENTS

All portions of the Contract Documents, and copies thereof furnished by the ENGINEER are instruments of service for this Project. They are not to be used on other work and are to be returned to the ENGINEER on request at the completion of the work. Any reuse of these materials without specific written verification or adaptation by the ENGINEER will be at the risk of the user and without liability or legal expense to the ENGINEER. Such user shall hold the ENGINEER harmless from any and all damages, including reasonable attorneys' fees, from any and all claims arising from any such reuse. Any such verification and adaptation shall entitle the ENGINEER to further compensation at rates to be agreed upon by the user and the ENGINEER.

THE ENGINEER

25. AUTHORITY OF THE ENGINEER

The ENGINEER will be the OWNER's representative during the construction period. His authority and responsibility will be limited to the Provisions set forth in these Contract Documents. The ENGINEER will have the Authority to reject work that does not conform to the Contract Documents. However, neither the ENGINEER's authority to act under this Provision, nor any decision made by him in good faith either to exercise or not to exercise such authority, shall give rise to any duty or responsibility of the ENGINEER to the CONTRACTOR, any SUBCONTRACTOR, their respective Sureties, any of their agents or employees, or any other person performing any of the work.

26. DUTIES AND RESPONSIBILITIES OF THE ENGINEER

The ENGINEER will make visits to the site at intervals appropriate to the various stages of construction to observe the Progress and quality of the work and to determine, in general, if the work is proceeding in accordance with the intent of the Contract Documents. He will not make comprehensive or continuous review or observation to check quality or quantity of the work, and he will not be responsible for construction means, methods, techniques, sequences, or Procedures, or for safety Precautions and Programs in connection with the work. Visits and observations made by the ENGINEER shall not relieve the CONTRACTOR of his obligation to conduct comprehensive inspections of the work and to furnish materials and perform acceptable work, and to provide adequate safety Precautions, in conformance with the intent of the Contract.

The ENGINEER will make recommendations to the OWNER, in writing, on all claims of the OWNER or the CONTRACTOR arising from interpretation or execution of the Contract Documents. Such recommendations will be of factual and/or technical nature, and will not include the legal interpretation of the Contract Documents. Any necessary legal interpretation of the Contract Document will be made by the OWNER. Such recommendation shall be necessary before the CONTRACTOR can receive additional money under the terms of the Contract. Changes in work ordered by the ENGINEER shall be made in compliance with Article CHANGES IN THE WORK.
One or more Project representatives may be assigned to observe the work. It is understood that such Project representatives shall have the authority to issue notice of nonconformance and make decisions within the limitations of the authority of the ENGINEER. The CONTRACTOR shall furnish all reasonable assistance required by the ENGINEER or Project representatives for Proper observation of the work. The above-mentioned Project representatives shall not relieve the CONTRACTOR of his obligations to conduct comprehensive inspections of the work and to furnish materials and perform acceptable work, and to provide adequate safety Precautions, in conformance with the intent of the Contract.

27. LIMITATIONS ON ENGINEER'S RESPONSIBILITIES

ENGINEER will not be responsible for CONTRACTOR's means, methods, techniques, sequences, or Procedures of construction, or the safety Precautions and Programs incident thereto, and ENGINEER will not be responsible for CONTRACTOR's failure to perform or furnish the work in accordance with the Contract Documents.

ENGINEER will not be responsible for the acts or omissions of CONTRACTOR or of any SUBCONTRACTOR, any supplier, or of any other person or organization performing or furnishing any of the work.

Whenever in the Contract Documents the terms "as ordered", "as directed", "as required", "as allowed", "as approved", or terms of like effect or import are used, or the adjectives "reasonable", "suitable", "acceptable", "Proper", or "satisfactory", or adjectives of like effect or import are used to describe a requirement, direction, review or judgment of ENGINEER as to the work, it is intended that such requirement, direction, review or judgment will be solely to evaluate the work for compliance with the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective shall not be effective to assign to ENGINEER any duty or authority to supervise or direct the furnishing or performance of the work or any duty or authority to undertake responsibility contrary to the Provisions of this Article.

28. REJECTED WORK

Any defective work or nonconforming materials or equipment that may be discovered at any time prior to expiration of the warranty period shall be removed and replaced by work which shall conform to the Provisions of the Contract Documents. Any material condemned or rejected shall be removed at once from the Project site.

Failure on the part of the ENGINEER to condemn or reject bad or inferior work or to note nonconforming materials or equipment on CONTRACTOR submittals shall not be construed to imply acceptance of such work. The OWNER shall reserve and retain all of its rights and remedies at law against the CONTRACTOR and its Surety for correction of any and all latent defects discovered after the guarantee period.

29. LINES AND GRADES

Lines and grades shall be established as provided in the supplementary conditions. All stakes, marks, and other reference information shall be carefully preserved by the CONTRACTOR, and in case of their careless or unnecessary destruction or removal by him or his employees, such stakes, marks, and other information shall be replaced at the CONTRACTOR's expense.

30. SUBMITTALS

After checking and verifying all field measurements and after complying with applicable Procedures specified in Division I, GENERAL REQUIREMENTS, CONTRACTOR shall submit to ENGINEER, in accordance with the schedule for submittals for review, shop drawings, electrical diagrams, and catalog cuts for fabricated items and manufactured items (including mechanical and electrical equipment), which shall bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's responsibilities under the Contract Documents with respect to the review of the submittal. All submittals shall be identified as ENGINEER may require. The data shown shall be complete with respect to quantities, dimensions specified, performance and design criteria, materials, and similar data to enable ENGINEER to review the information. CONTRACTOR shall also submit to ENGINEER for review, with such promptness as to cause no delay in work, all samples required by the Contract Documents. All samples shall have been checked by and accompanied by a specific written indication that CONTRACTOR has satisfied CONTRACTOR's responsibilities under the Contract Documents with respect to the review of the submission and shall be identified clearly as to material, supplier, pertinent data such as catalog numbers and the use for which intended.

Before submission of each submittal, CONTRACTOR shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar data with respect thereto and reviewed or coordinated each submittal with other submittals and with the requirements of the work and the Contract Documents.

At the time of each submission, CONTRACTOR shall give ENGINEER specific written notice of each variation that the submittal may have from the requirements of the Contract Documents, and, in addition, shall cause a specific notation to be made on each shop drawing submitted to ENGINEER for review and approval of each variation.

ENGINEER will review submittals with reasonable Promptness, but ENGINEER's review will be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents and shall not extend to means, methods, techniques, sequences, or Procedures of construction (except where a specific means, method, technique, sequence, or Procedure of construction is indicated in or required by the Contract Documents) or to safety Precautions or Programs incident thereto. The review of a separate item as such will not indicate review of the assembly in which the item functions. CONTRACTOR shall make corrections required by ENGINEER, and shall return the required number of corrected copies of shop drawings and submit as required new samples for review. CONTRACTOR shall direct specific attention in writing to revisions other than the corrections called for by ENGINEER on Previous submittals.

ENGINEER's review of submittals shall not relieve CONTRACTOR from the responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called ENGINEER's attention to each such variation at the time of submission and ENGINEER has given written approval of each such variation by a specific written notation thereof incorporated therein or accompanying the shop drawing or sample approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for errors or omissions in the shop drawings or from responsibility for having complied with the Provisions herein. Where a shop drawing or sample is required by the specifications, any related work performed prior to ENGINEER's review and approval of the pertinent submission shall be at the sole expense and responsibility of the CONTRACTOR.

31. DETAIL DRAWINGS AND INSTRUCTIONS

The ENGINEER will furnish, with reasonable Promptness, additional instructions by means of Drawings or otherwise, if, in the ENGINEER's opinion, such are required for the Proper execution of the work. All such Drawings and instructions will be consistent with the Contract Documents, true developments thereof, and reasonably inferable there from.

THE CONTRACTOR AND HIS EMPLOYEES

32. CONTRACTOR, AN INDEPENDENT AGENT

The CONTRACTOR shall independently perform all work under this Contract and shall not be considered as an agent of the OWNER or of the ENGINEER, nor shall the CONTRACTOR's SUBCONTRACTORS or employees be subagents of the OWNER or of the ENGINEER.

33. SUBCONTRACTING

Unless modified in the Supplementary Conditions, within 10 days after the execution of the Contract, the CONTRACTOR shall submit to the ENGINEER the names of all SUBCONTRACTORS Proposed for the work, including the names of any SUBCONTRACTORS that were submitted with the Bid. The CONTRACTOR shall not employ any SUBCONTRACTORS to which the OWNER may object to as lacking capability to properly perform work of the type and scope anticipated.

The CONTRACTOR is as fully responsible to the OWNER for the acts and omissions of his SUBCONTRACTORS and of persons either directly or indirectly employed by them as he is for the acts and omissions of persons directly employed by him.

Nothing contained in the Contract Documents shall create any contractual relationship between any SUBCONTRACTOR and the OWNER or ENGINEER.

34. INSURANCE AND LIABILITY

A. GENERAL

The CONTRACTOR shall provide (from insurance companies acceptable to the OWNER) the insurance coverage designated hereinafter and pay all costs before commencing work under this Contract. The CONTRACTOR shall furnish the OWNER with certificates of insurance specified herein showing the type, amount class of operations covered, effective dates, and date of expiration of policies, and containing substantially the following statement:
"The insurance covered by this certificate shall not be canceled or materially altered, except after 30 days' written notice has been received by the OWNER."

In case of the breach of any Provision of this Article, the OWNER, at his option, may take out and maintain, at the expense of the

CONTRACTOR, such insurance as the OWNER may deem Proper and may deduct the cost of such insurance from any monies which may be due or become due the CONTRACTOR under this Contract.

B. CONTRACTOR AND SUBCONTRACTOR INSURANCE

The CONTRACTOR shall not commence work under this Contract until he has obtained all the insurance required hereunder and such insurance has been reviewed by the OWNER, nor shall the CONTRACTOR allow any SUBCONTRACTOR to commence work on his subcontract until insurance specified below has been obtained. Review of the insurance by the OWNER shall not relieve or decrease the liability of the CONTRACTOR hereunder.

C. COMPENSATION AND EMPLOYER'S LIABILITY INSURANCE

The CONTRACTOR shall maintain during the life of this Contract the statutory amount of Workmen's Compensation Insurance, in addition, Employer's Liability Insurance in an amount as specified in the Supplementary Conditions, for each occurrence, for all of his employees to be engaged in work on the Project under this Contract. In case any such work is subcontracted, the CONTRACTOR shall require the SUBCONTRACTOR to provide similar Workmen's Compensation and Employer's Liability Insurance for all of the SUBCONTRACTOR's employees to be engaged in such work.

D. GENERAL LIABILITY INSURANCE (INCLUDING AUTOMOBILE)

The CONTRACTOR shall maintain during the life of this Contract such general liability, completed operations and Products liability, and automobile liability insurance as will Provide coverage for claims for damages for personal injury, including accidental death, as well as for claims for Property damage, which may arise directly or indirectly from performance of the work under this Contract. The general liability policy shall include contractual liability assumed by the CONTRACTOR under Article **INDEMNITY.** Coverage for Property damage shall be on a "broad form" basis with no exclusions for "X, C & U". The amount of insurance to be provided shall be as specified in the Supplementary Conditions.

In the event any work under this Contract is performed by a SUBCONTRACTOR, the CONTRACTOR shall be responsible for any liability directly or indirectly arising out of the work performed by the SUBCONTRACTOR; to the extent such liability is not covered by the SUBCONTRACTOR's insurance.

The OWNER and ENGINEER, their officers, agents, and employees shall be named as Additional Insured's on the CONTRACTOR's and any SUBCONTRACTOR's general liability and automobile liability insurance policies for any claims arising out of work performed under this Contract.

E. BUILDERS RISK ALL RISK INSURANCE

Unless otherwise modified in the Supplementary Conditions, the CONTRACTOR shall secure and maintain during the life of this Contract, Builders Risk All Risk Insurance coverage in an amount equal to the full value of the facilities under construction. Such insurance shall include coverage for earthquake, landslide, flood, collapse, loss due to the results of faulty workmanship or design, and all other normally covered risks, and shall provide for losses to be paid to the CONTRACTOR, OWNER, and ENGINEER as their interests may appear.

The OWNER and ENGINEER, their officers, agents, and employees shall be named as additional insured's on the CONTRACTOR's and any SUBCONTRACTOR's Builders Risk All Risk insurance policies for any claims arising out of work performed under this Contract.

This insurance shall include a waiver of subrogation as to the ENGINEER, the OWNER, the CONTRACTOR, and their respective officers, agents, employees and SUBCONTRACTORS.

F. NO PERSONAL LIABILITY OF PUBLIC OFFICIALS

In carrying out any of the Provisions hereof in exercising any authority granted by the Contract, there will be no personal liability upon any public official.

35. INDEMNITY

To the maximum extent permitted by law, the CONTRACTOR shall indemnify and defend the OWNER and the ENGINEER, and their officers, employees, agents, and sub-consultants, from all claims and losses, including attorney's fees and litigation costs arising out of Property losses or health, safety, personal injury, or death claims by the CONTRACTOR, its SUBCONTRACTORS of any tier, and their employees, agents, or invitees regardless of the fault, breach of Contract, or negligence of the OWNER or ENGINEER, excepting only such claims or losses that have been adjudicated to have been caused solely by the negligence of the OWNER or the ENGINEER and regardless of whether or not the CONTRACTOR is or can be named a party in a litigation.

36. EXCLUSION OF CONTRACTOR CLAIMS

In performing its obligations, the ENGINEER and its consultants may cause expense for the CONTRACTOR or its SUBCONTRACTORS and equipment or material suppliers. However, those parties and their sureties shall maintain no direct action against the ENGINEER, its officers, employees, agents, and consultants for any claim arising out of, in connection with, or resulting from the ENGINEERing services performed or required to be performed.

37. TAXES AND CHARGES

The CONTRACTOR shall withhold and pay any and all sales and use taxes and all withholding taxes, whether State or Federal, and pay all Social Security charges and also all State Unemployment Compensation charges, and pay or cause to be withheld, as the case may be, any and all taxes, charges, or fees or sums whatsoever, which are now or may hereafter be required to be paid or withheld under any laws.

38. REQUIREMENTS OF STATE LAW FOR PUBLIC WORKS PROJECTS

When the Contract Documents concern public works of the state or any county, municipality, or political subdivision created by its laws, the applicable statutes shall apply. All parties to this Contract shall determine the contents of all applicable statutes and comply with their Provisions throughout the performance of the Contract.

39. CODES, ORDINANCES, PERMITS AND LICENSES

The CONTRACTOR shall keep himself fully informed of all local codes and ordinances, as well as state and federal laws, which in any manner affect the work herein specified. The CONTRACTOR shall at all times comply with said codes and ordinances, laws, and regulations, and Protect and indemnify the OWNER, the ENGINEER and their respective employees, and its officers and agents against any claim or liability arising from or based on the violation of any such laws, ordinances, or regulations. All permits, licenses and inspection fees necessary for Prosecution and completion of the work shall be secured and paid for by the CONTRACTOR, unless otherwise specified.

40. SUPERINTENDENCE

The CONTRACTOR shall keep at the project site, competent supervisory personnel. The CONTRACTOR shall designate, in writing, before starting work, a Project superintendent who shall be an employee of the CONTRACTOR and shall have complete authority to represent and to act for the CONTRACTOR. ENGINEER shall be notified in writing prior to any change in superintendent assignment. The CONTRACTOR shall give efficient supervision to the work, using his best skill and attention. The CONTRACTOR shall be solely responsible for all construction means, methods, techniques, and Procedures, and for providing adequate safety Precautions and coordinating all portions of the work under the Contract. It is specifically understood and agreed that the ENGINEER, its employees and agents, shall not have control or charge of and shall not be responsible for the construction means, methods, techniques, procedures, or for providing adequate safety precautions in connection with the work under Contract.

41. RECEPTION OF ENGINEER'S COMMUNICATIONS

The superintendent shall receive for the CONTRACTOR all communications from the ENGINEER. Communications of major importance will be confirmed in writing upon request from the CONTRACTOR.

The ENGINEER may schedule Project meetings for the purposes of discussing and resolving matters concerning the various

elements of the work. Time and place for these meetings and the names of persons required to be Present shall be as determined by the ENGINEER. CONTRACTOR shall comply with these attendance requirements and shall also require his SUBCONTRACTORS to comply.

42. SAFETY

The CONTRACTOR shall be solely and completely responsible for conditions of the jobsite, including safety of all persons (including employees) and Property during performance of the work. This requirement shall apply continuously and not be limited to normal working hours. Safety Provisions shall conform to U.S. Department of Labor (OSHA), and all other applicable federal, state, county, and local laws, ordinances, codes, and regulations. Where any of these are in conflict, the more stringent requirement shall be followed. The CONTRACTOR's failure to thoroughly familiarize himself with the aforementioned safety Provisions shall not relieve him from compliance with the obligations and penalties set forth therein.

The CONTRACTOR shall develop and maintain for the duration of this Contract, a safety Program that will effectively incorporate and implement all required safety Provisions. The CONTRACTOR shall appoint an employee who is qualified and authorized to supervise and enforce compliance with the safety Program. The duty of the ENGINEER to conduct construction review of the work does not include review or approval of the adequacy of the CONTRACTOR's safety Program, safety supervisor, or any safety measures taken in, on, or near the construction site. The CONTRACTOR, as a part of his safety Program, shall maintain at his office or other well-known place at the jobsite, safety equipment applicable to the work as Prescribed by the aforementioned authorities, all articles necessary for giving first-aid to the injured, and shall establish the Procedure for the immediate removal to a hospital or a doctor's care of persons (including employees) who may be injured on the jobsite.

If death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger to both the ENGINEER and the OWNER. In addition, the CONTRACTOR must promptly report in writing to the ENGINEER all accidents whatsoever arising out of, or in connection with, the performance of the work whether on, or adjacent to, the site, giving full details and statements of witnesses.

If a claim is made by anyone against the CONTRACTOR or any SUBCONTRACTOR on account of any accident, the CONTRACTOR shall promptly report the facts in writing to the ENGINEER, giving full details of the claim.

43. PROTECTION OF WORK AND PROPERTY

The CONTRACTOR shall at all times safely guard and Protect from damage the OWNER's Property, adjacent Property, and his own work from injury or loss in connection with this Contract. All facilities required for Protection by federal, state, or municipal laws and regulations and local conditions must be provided and maintained. The CONTRACTOR shall Protect his work and materials from damage due to the nature of the work, the elements, carelessness of other CONTRACTORs, or from any cause whatever until the completion and acceptance of the work. All loss or damages arising out of the nature of the work to be done under these Contract Documents, or from any unforeseen obstruction or defects which may be encountered in the Prosecution of the work, or from the action of the elements, shall be sustained by the CONTRACTOR.

44. RESPONSIBILITY OF CONTRACTOR TO ACT IN AN EMERGENCY

In case of an emergency which threatens loss or injury of Property, and/or safety of life, the CONTRACTOR shall act, without previous instructions from the OWNER or ENGINEER, as the situation may warrant. The CONTRACTOR shall notify the ENGINEER thereof immediately thereafter. Any claim for compensation by the CONTRACTOR, together with substantiating documents in regard to expense, shall be submitted to the OWNER through the ENGINEER and the amount of compensation shall be determined by agreement.

45. MATERIALS AND APPLIANCES

Unless otherwise stipulated, the CONTRACTOR shall Provide and pay for all materials, labor, water, tools, equipment, heat, light, fuel, power, transportation, construction equipment and machinery, appliances, telephone, sanitary facilities, temporary facilities and other facilities and incidentals necessary for the execution and completion of the work.

Unless otherwise specified, all materials shall be new, and both workmanship and materials shall be of good quality. The

CONTRACTOR shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

In selecting and/or approving equipment for installation in the Project, the OWNER and ENGINEER assume no responsibility for injury or claims resulting from failure of the equipment to comply with applicable federal, state, and local safety codes or requirements, or the safety requirements of a recognized agency, or failure due to faulty design concepts, or defective workmanship and materials.

46. CONTRACTORS' AND MANUFACTURERS' COMPLIANCE WITH STATE SAFETY, OSHA, AND OTHER CODE REQUIREMENTS

The completed work shall include all necessary permanent safety devices, such as machinery guards and similar ordinary safety items required by the state and federal (OSHA) industrial authorities and applicable local and national codes. Further, any features of the work subject to such safety regulations shall be fabricated, furnished, and installed (including OWNER-furnished equipment) in compliance with these requirements. CONTRACTORs and manufacturers of equipment shall be held responsible for compliance with the requirements included herein. CONTRACTORs shall notify all equipment suppliers and SUBCONTRACTORS of the Provisions of this Article.

47. SUBSTITUTION OF MATERIALS

Except for OWNER-selected equipment items, and items where no substitution is clearly specified, whenever any material, article, device, Product, fixture, form, type of construction, or Process is indicated or specified by patent or Proprietary name, by name of manufacturer, or by catalog number, such specifications shall be deemed to be used for the purpose of establishing a standard of quality and facilitating the description of the material or Process desired. This Procedure is not to be construed as eliminating from competition other Products of equal or better quality by other manufacturers where fully suitable in design, and shall be deemed to be followed by the words "or equal". The CONTRACTOR may, in such cases, submit complete data to the ENGINEER for consideration of another material, type, or Process that shall be substantially equal in every respect to that so indicated or specified. Substitute materials shall not be used unless approved in writing. The ENGINEER will be the sole judge of the substituted article or material.

48. TESTS, SAMPLES, AND OBSERVATIONS

The CONTRACTOR shall furnish, without extra charge, the necessary test pieces and samples, including facilities and labor for obtaining the same, as requested by the ENGINEER. When required, the CONTRACTOR shall furnish certificates of tests of materials and equipment made at the point of manufacture by a recognized testing laboratory.

The OWNER, ENGINEER, and authorized government agents, and their representatives shall at all times be Provided safe access to the work wherever it is in Preparation or Progress, and the CONTRACTOR shall Provide facilities for such access and for observations, including maintenance of temporary and permanent access.

If the Specifications, laws, ordinances, or any public authority require any work, to be specially tested or approved, the CONTRACTOR shall give timely notice of its readiness for observations. If any work should be covered up without approval or consent of the ENGINEER, it shall, if required by the ENGINEER, be uncovered for examination at the CONTRACTOR's expense. Reexamination of questioned work may be ordered by the ENGINEER, and, if so ordered, the work shall be uncovered by the CONTRACTOR. If such work is found to be in accordance with the Contract Documents, the OWNER will pay the cost of uncovering, exposure, observation, inspection, testing and reconstruction. If such work is found to be not in accordance with the Contract Documents, the CONTRACTOR shall correct the defective work, and the cost of reexamination and correction of the defective work shall be paid by the CONTRACTOR.

49. ROYALTIES AND PATENTS

The CONTRACTOR shall pay all royalty and licenses fees, unless otherwise specified. The CONTRACTOR shall defend all suits or claims for infringement of any patent rights and shall save the OWNER and the ENGINEER harmless from any and all loss, including reasonable attorneys' fees, on account thereof.

50. CONTRACTOR'S RIGHT TO TERMINATE CONTRACT

If the work should be stopped under an order of any court or other public authority for a period of more than 3 months, through no act or fault of the CONTRACTOR, its SUBCONTRACTORS, or respective employees or if the ENGINEER should fail to make recommendation for payment to the OWNER or return payment request to CONTRACTOR for revision within 30 days after it is due, or if the OWNER should fail to pay the CONTRACTOR within 30 days after time specified in Article PARTIAL PAYMENTS, any sum recommended by the ENGINEER, then the CONTRACTOR may, upon 15 days' written notice to the OWNER and the ENGINEER, stop work or terminate this Contract and recover from the OWNER payment for all acceptable work performed and reasonable termination expenses, unless said default has been remedied.

51. CORRECTION OF DEFECTIVE WORK DURING WARRANTY PERIOD

The CONTRACTOR hereby agrees to make, at his own expense, all repairs or replacements necessitated by defects in materials or workmanship, Provided under terms of this Contract, and pay for any damage to other works resulting from such defects, which become evident within 2 years after the date of final acceptance of the work or within 2 years after the date of substantial completion established by the ENGINEER for specified items of equipment, or within such longer period as may be Prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents. Un-remedied defects identified for correction during the warranty period but remaining after its expiration shall be considered as part of the obligations of the warranty. Defects in material, workmanship, or equipment which are remedied as a result of obligations of the warranty shall subject the remedied portion of the work to an extended warranty period of 2 years after the defect has been remedied.

The CONTRACTOR further assumes responsibility for a similar guarantee for all work and materials provided by SUBCONTRACTORS or manufacturers of packaged equipment components. The effective date for the start of the guarantee or warranty period for equipment qualifying as substantially complete is defined in Article SUBSTANTIAL COMPLETION, AND Article SUBSTANTIAL COMPLETION DATE, in these General Conditions.

The CONTRACTOR also agrees to hold the OWNER and the ENGINEER harmless from liability of any kind arising from damage due to said defects. The CONTRACTOR shall make all repairs and replacements promptly upon receipt of written order for same from the OWNER. If the CONTRACTOR fails to make the repairs and replacements promptly, or in an emergency where delay would cause serious risk, or loss, or damage, the OWNER may have the defective work corrected or the rejected work removed and replaced, and the CONTRACTOR and his Surety shall be liable for the cost thereof.

PROGRESS OF THE WORK

52. BEGINNING OF THE WORK

Following execution of the Contract, the CONTRACTOR shall meet with the OWNER and ENGINEER relative to his arrangements for prosecuting the work.

53. SCHEDULES AND PROGRESS REPORTS

Prior to starting the construction, the CONTRACTOR shall Prepare and submit to the ENGINEER, a Progress schedule showing the dates on which each part or division of the work is expected to be started and finished, and a Preliminary schedule for submittals. The Progress schedule for submittals shall be brought up to date and submitted to the ENGINEER at the end of each month or at such other times the ENGINEER may request.

The CONTRACTOR shall forward to the ENGINEER, at the end of each month, an itemized report of the delivery status of major and critical items of purchased equipment and material, including shop drawings and the status of shop and field fabricated work. These Progress reports shall indicate the date of the purchase order, the current percentage of completion, estimated delivery, and cause of delay, if any.

If the completion of any part of the work or the delivery of materials is behind the submitted Progress schedule, the CONTRACTOR shall submit in writing a plan acceptable to the OWNER and ENGINEER for bringing the work up to schedule.

The OWNER shall have the right to withhold Progress payments for the work if the CONTRACTOR fails to update and submit the Progress schedule and reports as specified.

54. PROSECUTION OF THE WORK

It is expressly understood and agreed that the time of beginning, rate of Progress, and time of completion of the work are the essence of this Contract. The work shall be prosecuted at such time, and in or on such part or parts of the Project as may be required, to complete the Project as contemplated in the Contract Documents and the Progress schedule.

If the CONTRACTOR desires to carry on work at night or outside the regular hours, he shall give timely notice to the ENGINEER to allow satisfactory arrangements to be made for observing the work in Progress.

55. OWNER'S RIGHT TO RETAIN IMPERFECT WORK

If any part or portion of the work completed under this Contract shall Prove defective and not in accordance with the Drawings and Specifications, and if the imperfection in the same shall not be of sufficient magnitude or importance as to make the work dangerous or unsuitable, or if the removal of such work will create conditions which are dangerous or undesirable, the OWNER shall have the right and authority to retain such work but will make such deductions in the final payment therefore as may be just and reasonable.

56. OWNER'S RIGHT TO DO WORK

Should the CONTRACTOR neglect to Prosecute the work in conformance with the Contract Documents or neglect or refuse at his own cost to remove and replace work rejected by the ENGINEER, then the OWNER may notify the Surety of the condition, and after 10 days' written notice to the CONTRACTOR and the Surety, or without notice if an emergency or danger to the work or public exists, and without Prejudice to any other right which the OWNER may have under Contract, or otherwise, take over that portion of the work which has been improperly or non-timely executed, and make good the deficiencies and deduct the cost thereof from the payments then or thereafter due the CONTRACTOR.

57. OWNER'S RIGHT TO TRANSFER EMPLOYMENT

If the CONTRACTOR should abandon the work or if he should persistently or repeatedly refuse or should fail to make prompt payment to SUBCONTRACTORS for material or labor, or to persistently disregard laws, ordinances, or to prosecute the work in conformance with the Contract Documents, or otherwise be guilty of a substantial violation of any Provision of the Contract or any laws or ordinance, then the OWNER may, without Prejudice to any other right or remedy, and after giving the CONTRACTOR and Surety 10 days' written notice, transfer the employment for said work from the CONTRACTOR to the Surety. Upon receipt of such notice, such Surety shall enter upon the Premises and take possession of all materials, tools, and appliances thereon for the purpose of completing the work included under this contract and employ by Contract or otherwise, any qualified person or persons to finish the work and Provide the materials therefore, in accordance with the Contract Documents, without termination of the continuing full force and effect of this contract. In case of such transfer of employment to such Surety, the Surety shall be paid in its own name on estimates according to the terms hereof without any right of the CONTRACTOR to make any claim for the same or any part thereof.

If, after the furnishing of said written notice to the Surety, the CONTRACTOR and the Surety still fail to make reasonable Progress on the performance of the work, the OWNER may terminate the employment of the CONTRACTOR and take possession of the Premises and of all materials, tools, and appliances thereon and finish the work by whatever method he may deem expedient and charge the cost thereof to the CONTRACTOR and the Surety. In such case, the CONTRACTOR shall not be entitled to receive any further payment until the work is finished. If the expense of completing the Contract, including compensation for additional managerial and administrative services, shall exceed such unpaid balance, the CONTRACTOR and the Surety shall pay the difference to the OWNER.

58. DELAYS AND EXTENSION OF TIME

If the CONTRACTOR is delayed in the Progress of the work by any act or neglect of the OWNER or the ENGINEER, or by any separate CONTRACTOR employed by the OWNER, or by strikes, lockouts, fire, adverse weather conditions not reasonably anticipated, or acts of Nature, and if the CONTRACTOR, within 48 hours of the start of the occurrence, gives written notice to the OWNER of the cause of the potential delay and estimate of the possible time extension involved, and within 10 days after the cause of the delay has been remedied, the CONTRACTOR gives written notice to the OWNER of any actual time extension requested as a result of the aforementioned occurrence, then the Contract time may be extended by change order for such reasonable time as the

ENGINEER determines. It is agreed that no claim shall be made or allowed for any damages, loss, or expense which may arise out of any delay caused by the above referenced acts or occurrences other than claims for the appropriate extension of time. No extension of time will be granted to the CONTRACTOR for delays occurring to parts of the work that have no measurable impact on the completion of the total work under this Contract. No extension of time will be considered for weather conditions reasonably anticipated for the area in which the work is being performed. Reasonably anticipated weather conditions will be based on official records of monthly Precipitation and other historical data. Adverse weather conditions, if determined to be of a severity that would impact Progress of the work, may be considered as cause for an extension of Contract completion time.

Delays in delivery of equipment or material purchased by the CONTRACTOR or his SUBCONTRACTORS, including OWNER-selected equipment shall not be considered as a just cause for delay, unless the OWNER determines that for good cause the delay is beyond the control of the CONTRACTOR. The CONTRACTOR shall be fully responsible for the timely ordering, scheduling, complete the work is the per-diem rate, as stipulated in the Bid. The said amount is hereby agreed upon as a reasonable estimate of the costs, which may be accrued by the OWNER after the expiration of the time of completion. It is expressly under- stood and agreed that this amount is not to be considered in the nature of a penalty, but as liquidated damages which have accrued against the CONTRACTOR. The OWNER shall have the right to deduct such damages from any amount due, or that may become due the CONTRACTOR, or the amount of such damages shall be due and collectible from the CONTRACTOR or Surety.

59. DIFFERING SITE CONDITIONS

The CONTRACTOR shall promptly, and before the conditions are disturbed, give a written notice to the OWNER and ENGINEER of:

A. subsurface or latent physical conditions at the site which differ materially from those indicated in this contract,
B. unknown physical conditions at the site, of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract.

The ENGINEER will investigate the site conditions promptly after receiving the notice. If the conditions do materially so differ and cause an increase or decrease in the CONTRACTOR's cost of, or the time required for, performing any part of the work under this Contract, whether or not changed as a result of the conditions, and equitable adjustment shall be made under this Article and the Contract modified in writing accordingly.

No request by the CONTRACTOR for an equitable adjustment to the Contract under this Article will be allowed, unless the CONTRACTOR has given the written notice required; provided that the time prescribed above for giving written notice may be extended by the OWNER.

No request by the CONTRACTOR for an equitable adjustment to the Contract for differing site conditions will be allowed if made after final payment under this Contract.

60. LIQUIDATED DAMAGES

Should the CONTRACTOR fail to complete the work, or any part thereof, in the time agreed upon in the Contract or within such extra time as may have been allowed for delays by extensions granted as Provided in the Contract, the CONTRACTOR shall reimburse the OWNER for the additional expense and damage for each calendar day, Sundays and legal holidays included, that the Contract remains uncompleted after the Contract completion date. It is agreed that the amount of such additional expense and damage incurred by reason of failure to complete the work is the per-diem rate, as stipulated in the Bid. The said amount is hereby agreed upon as a reasonable estimate of the costs which may be accrued by the OWNER after the expiration of the time of completion. It is expressly under- stood and agreed that this amount is not to be considered in the nature of a penalty, but as liquidated damages which have accrued against the CONTRACTOR. The OWNER shall have the right to deduct such damages from any amount due, or that may become due the CONTRACTOR, or the amount of such damages shall be due and collectible from the CONTRACTOR or Surety.

61. OTHER CONTRACTS

The OWNER reserves the right to let other Contracts in connection with the work. The CONTRACTOR shall afford other CONTRACTORs reasonable opportunity for the introduction and storage of their materials and the execution of their work and shall properly connect and coordinate his work with theirs.

If any part of the work under this Contract depends for Proper execution or results upon the work of any other CONTRACTOR, utility service company or OWNER, the CONTRACTOR shall inspect and Promptly report to the ENGINEER in writing any patent or apparent defects to deficiencies in such work that render it unsuitable for such Proper execution and results. The CONTRACTOR's failure to so report shall constitute and acceptance of the work by others as being fit and Proper for integration with work under this Contract, except for latent or non-apparent defects and deficiencies in the work.

62. USE OF PREMISES

The CONTRACTOR shall confine his equipment, the storage of materials and the operation of his workers to limits shown on the Drawings or indicated by law, ordinances, permits, or directions of the ENGINEER, and shall not unreasonably encumber the Premises with his materials. The CONTRACTOR shall provide, at his own expense, the necessary rights-of-way and access to the work, which may be required outside the limits of the OWNER's Property and shall furnish the ENGINEER copies of permits and agreements for use of the Property outside that provided by the OWNER.

The CONTRACTOR shall not load nor permit any part of the structure to be loaded in any manner that will endanger the structure, nor shall CONTRACTOR subject any part of the work or adjacent Property to stresses or Pressures that will endanger it.

63. SUBSTANTIAL COMPLETION DATE

The ENGINEER may issue a written notice of substantial completion for the purpose of establishing the starting date for specific equipment guarantees, and to establish the date that the OWNER will assume the responsibility for the cost of operating such equipment. Said notice shall not be considered as final acceptance of any portion of the work or relieve the CONTRACTOR from completing the remaining work within the specified time and in full compliance with the Contract Documents. See SUBSTANTIAL COMPLETION under DEFINITIONS of these General Conditions.

64. PERFORMANCE TESTING

Operating equipment and systems shall be performance tested in the Presence of the ENGINEER to demonstrate compliance with the specified requirements. Performance testing shall be conducted under the specified design operating conditions or under such simulated operating conditions as recommended or approved by the ENGINEER. Schedule such testing with the ENGINEER at least one week in advance of the planned date for testing.

65. OWNER'S USE OF PORTIONS OF THE WORK

Following issuance of the written notice of Substantial Completion, the OWNER may initiate operation of the facility. Such use shall not be considered as final acceptance of any portion of the work, nor shall such use be considered as cause for an extension of the Contract completion time, unless authorized by a Change Order issued by the OWNER.

66. CUTTING AND PATCHING

The CONTRACTOR shall do all cutting, fitting, or patching of his work that may be required to make its several parts come together Properly and fit it to receive or be received by work of other CONTRACTORs shown upon or reasonably implied by the Drawings.

67. CLEANING UP

The CONTRACTOR shall, at all times, keep Property on which work is in Progress and the adjacent Property free from accumulations of waste material or rubbish caused by employees or by the work. Upon completion of the construction, the CONTRACTOR shall remove all temporary structures, rubbish, and waste materials resulting from his operations.

PAYMENT

68. PAYMENT FOR CHANGE ORDERS

The OWNER's request for quotations on alterations to the work shall not be considered authorization to proceed with the work expediting, delivery, and installation of all equipment and materials. Within a reasonable period after the CONTRACTOR submits

to the OWNER a written request for an extension of time, the ENGINEER will Present his written opinion to the OWNER as to whether an extension of time is justified, and, if so, his recommendation as to the number of days for time extension. The OWNER will make the final decision on all requests for extension of time.

Prior to the issuance of a formal Change Order, nor shall such request justify any delay in existing work. Quotations for alterations to the work shall include substantiating documentation with an itemized breakdown of CONTRACTOR and SUBCONTRACTOR costs, including labor, material, rentals, approved services, overhead, and profit. OWNER may require detailed cost data in order to substantiate the reasonableness of the proposed costs.

Any compensation paid in conjunction with the terms of a Change Order shall comprise total compensation due the CONTRACTOR for the work or alteration defined in the Change Order. By signing the Change Order, the CONTRACTOR acknowledges that the stipulated compensation includes payment for the work or alteration plus all payment for the interruption of schedules, extended overhead, delay, or any other impact claim or ripple effect, and by such signing specifically waives any reservation or claim for additional compensation in respect to the subject Change Order.

At the OWNER's option, payment or credit for any alterations covered by a Change Order shall be determined by one or a combination of the methods set forth in A, B, or C below, as applicable:

A. UNIT PRICES

Those unit Prices stipulated in the Bid shall be utilized where they are applicable. In the event the Change Order results in a change in the original quantity that is materially and significantly different from the original bid quantity, a new unit Price shall be negotiated upon demand of either party. Unit Prices for new items included in the Change Order shall be negotiated and mutually agreed upon.

B. LUMP SUM

A total lump sum for the work negotiated and mutually acceptable to the CONTRACTOR and the OWNER. Lump sum quotations for modifications to the work shall include substantiating documentation with an itemized breakdown of CONTRACTOR and SUBCONTRACTOR costs, including labor, material, rentals, approved services, overhead, and Profit, all calculated as specified under "C" below.

C. COST REIMBURSEMENT WORK

The term "cost reimbursement" shall be understood to mean that payment for the work will be made on a time and expense basis, that is, on an accounting of the CONTRACTOR's forces, materials, equipment, and other items of cost as required and used to do the work.

If the method of payment cannot be agreed upon Prior to the beginning of the work, and the OWNER directs by written Change Order that the work be done on a cost reimbursement basis, then the CONTRACTOR shall furnish labor, and furnish and install equipment and materials necessary to complete the work in a satisfactory manner and within a reasonable period of time. For the work performed, payment will be made for the documented actual cost of the following:

1. Labor including foremen for those hours they are assigned and participating in the cost reimbursement work (actual payroll cost, including wages, fringe benefits as established by negotiated labor agreements, labor insurance, and labor taxes as established by law). No other fixed labor burdens will be considered, unless approved in writing by the OWNER.
2. Material delivered and used on the designated work, including sales tax, if paid by the CONTRACTOR or his SUBCONTRACTOR.
3. Rental or equivalent rental cost of equipment, including necessary transportation for items having a value in excess of $100. Rental or equivalent rental cost will be allowed for only those days or hours during which the equipment is in actual use. Rental and transportation allowances shall not exceed the current rental rates prevailing in the locality. The rentals allowed for equipment will, in all cases, be understood to cover all fuel, supplies, repairs, and renewals, and no further allowances will be made for those items, unless specific agreement to that effect is made.
4. Additional bond, as required and approved by the OWNER.
5. Additional insurance (other than labor insurance) as required and approved by the OWNER.

In addition to items 1 through 5 above, an added fixed fee for general overhead and Profit shall be negotiated and allowed for

the CONTRACTOR (or approved SUBCONTRACTOR) actually executing the Cost Reimbursement work.

An additional fixed fee shall be negotiated and allowed the CONTRACTOR for the administrative handling of portions of the work that are executed by an approved SUBCONTRACTOR. No additional fixed fee will be allowed for the administrative handling of work executed by a SUBCONTRACTOR of a SUBCONTRACTOR, unless by written permission from the OWNER.

The added fixed fees shall be considered to be full compensation, covering the cost of general supervision, overhead, Profit, and any other general expense. The CONTRACTOR's records shall make clear distinction between the direct costs of work paid for on a cost reimbursement basis and the costs of other work. The CONTRACTOR shall furnish the ENGINEER report sheets in duplicate of each day's cost reimbursement work no later than the working day following the performance of said work. The daily report sheets shall itemize the materials used, and shall cover the direct cost of labor and the charges for equipment rental, whether furnished by the CONTRACTOR, SUBCONTRACTOR or other forces. The daily report sheets shall provide names or identifications and classifications of workers, the hourly rate of pay and hours worked, and also the size, type, and identification number of equipment and hours operated.

Material charges shall be substantiated by valid copies of vendors' invoices. Such invoices shall be submitted with the daily report sheets, or, if not available, they shall be submitted with subsequent daily report sheets. Said daily report sheets shall be signed by the CONTRACTOR or his authorized agent.

The OWNER reserves the right to furnish such materials and equipment as he deems expedient and the CONTRACTOR shall have no claim for profit or added fees on the cost of such materials and equipment. To receive partial payments and final payment for cost reimbursement work, the CONTRACTOR shall submit to the ENGINEER, detailed and complete documented verification of the CONTRACTOR's and any of his SUBCONTRACTORS' actual costs involved in the cost reimbursement work. Such costs shall be submitted within 30 days after said work has been performed.

69. PARTIAL PAYMENTS

A. GENERAL

Nothing in this Article shall be construed to affect the right, hereby reserved, to reject the whole or any part of the aforesaid work, should such work be later found not to comply with the Provisions of the Contract Documents. All estimated quantities of work for which partial payments have been made are subject to review and correction on the final estimate. Payment by the OWNER and acceptance by the CONTRACTOR of partial payments based on periodic estimates of quantities of work performed shall not, in any way, constitute acceptance of the estimated quantities used as a basis for computing the amounts of the partial payments.

B. ESTIMATE

At least 30 days before each Progress payment falls due, as specified in the Supplementary Conditions, the CONTRACTOR shall submit to the ENGINEER a detailed estimate of the amount earned during the Preceding month for the separate portions of the work, and request payment. As used in this Article, the words "amount earned" means the value, on the date of the estimate for partial payment, of the work completed in accordance with the Contract Documents, and the value of approved materials delivered to the Project site suitable stored and Protected Prior to incorporation into the work.

ENGINEER will, within 7 days after receipt of each request for payment, either indicate in writing a recommendation of payment and present the request to OWNER, or return the request to CONTRACTOR indicating in writing ENGINEER's reasons for refusing to recommend payment. In the latter case, CONTRACTOR may, within 7 days, make the necessary corrections and resubmit the request.

ENGINEER may refuse to recommend the whole or any part of any payment if, in his opinion, it would be incorrect to make such representations to OWNER. ENGINEER may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously recommended to such an extent as may be necessary in ENGINEER's opinion to protect the OWNER from loss because:

1. The work is defective, or completed work has been damaged requiring correction or replacement;

2. Written claims have been made against OWNER or Liens have been filed in connection with the work;
3. The Contract Price has been reduced because of Change Orders;

4. OWNER has been required to correct defective work or complete the work in accordance with Article OWNER'S RIGHT TO DO WORK;

5. Of CONTRACTOR's unsatisfactory Prosecution of the work in accordance with the Contract Documents; or

6. CONTRACTOR's failure to make payment to SUBCONTRACTORS or for labor, materials, or equipment.

C. DEDUCTION FROM ESTIMATE

Unless modified in the Supplementary Conditions, deductions from the estimate will be as described below:

1. The OWNER will deduct from the estimate, and retain as part security, 10 percent of the amount earned for work satisfactorily completed. A deduction and retainage of 10 percent will be made on the estimated amount earned for approved items of material delivered to and properly stored at the jobsite but not incorporated into the work. When the work is 50 percent complete, the OWNER may reduce the retainage to 5 percent of the dollar value of all work satisfactorily completed to date provided the CONTRACTOR is making satisfactory progress and there is no specific cause for a greater retainage. The OWNER may reinstate the retainage up to 10 percent if the OWNER determines, at his discretion, that the CONTRACTOR is not making satisfactory progress or where there is other specific cause for such withholding.

D. QUALIFICATION FOR PARTIAL PAYMENT FOR MATERIALS DELIVERED

Unless modified in the Supplementary Conditions, qualification for partial payment for materials delivered but not yet incorporated into the work shall be as described below:

1. Materials, as used herein, shall be considered to be those items which are fabricated and manufactured material and equipment. No consideration shall be given to individual purchases of less than $200 for any one item.

2. To receive partial payment for materials delivered to the site, but not incorporated in the work, it shall be necessary for the CONTRACTOR to include a list of such materials on the Partial Payment Request. At his sole discretion, the ENGINEER may approve items for which partial payment is to be made. Partial payment shall be based on the CONTRACTOR's actual cost for the materials as evidenced by invoices from the supplier. Proper storage and Protection shall be provided by the CONTRACTOR, and as approved by the ENGINEER. Final payment shall be made only for materials actually incorporated in the work and, upon acceptance of the work, all materials remaining for which advance payments had been made shall revert to the CONTRACTOR, unless otherwise agreed, and partial payments made for these items shall be deducted from the final payment for the work.

3. CONTRACTOR warrants and guarantees that title to all work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to OWNER at the time of payment free and clear of all liens, claims, security interests, and encumbrances.
4. If requested by the ENGINEER, the CONTRACTOR shall provide, with subsequent pay requests, invoices receipted by the supplier showing payment in full has been made.

E. PAYMENT

After deducting the retainage and the amount of all previous partial payments made to the CONTRACTOR from the amount earned, the amount due will be made payable to the CONTRACTOR. Recommendations for payment received by the OWNER less than 9 days Prior to the scheduled day for payment will not be Processed or paid until the following month.

70. CLAIMS FOR EXTRA WORK

In any case where the CONTRACTOR deems additional time or compensation will become due him under this Contract for circumstances other than those defined in Article DELAYS AND EXTENSION OF TIME, the CONTRACTOR shall notify the ENGINEER, in writing, of his intention to make claim for such time or compensation before he begins the work on which he bases

the claim, in order that such matters may be settled, if possible, or other appropriate action taken. The notice of claim shall be in duplicate, in writing, and shall state the circumstances and the reasons for the claim, but need not state the amount. If such notification is not given or if the ENGINEER is not afforded proper facilities by the CONTRACTOR for keeping strict account of actual cost, then the CONTRACTOR hereby agrees to waive the claim for such additional time or compensation. Such notice by the CONTRACTOR, and fact that the ENGINEER has kept account of the cost as aforesaid, shall not in any way be construed as proving the validity of the claim.

No extension of time will be granted to the CONTRACTOR for delays resulting from extra work that have no measurable impact on the completion of the total work under this Contract. Claims for additional time or compensation shall be made in itemized detail and submitted, in writing, to the OWNER and ENGINEER within 10 days following completion of that portion of the work for which the CONTRACTOR bases his claim. Failure to make the claim for additional compensation in the manner and within the time specified above shall constitute waiver of that claim. In case the claim is found to be just, it shall be allowed and paid for as provided in Article PAYMENT FOR CHANGE ORDERS.

71. RELEASE OF LIENS OR CLAIMS

The CONTRACTOR shall indemnify and hold harmless the OWNER from all claims for labor and materials furnished under this Contract. Prior to the final payment, the CONTRACTOR shall furnish to the OWNER, as part of his final payment request, a certification that all of the CONTRACTOR's obligations on the project have been satisfied and that all monetary claims and indebtedness have been paid. The CONTRACTOR shall furnish complete and legal effective releases or waivers, satisfactory to the OWNER, of all liens arising out of or filed in connection with the work.

72. FINAL PAYMENT

Upon completion of all the work under this Contract, the CONTRACTOR shall notify the ENGINEER, in writing, that he has completed his part of the Contract and shall request final payment. Upon receipt of such notice the ENGINEER will inspect and, if acceptable, submit to the OWNER his recommendation as to acceptance of the completed work and as to the final estimate of the amount due the CONTRACTOR. Upon approval of this final estimate by the OWNER and compliance by the CONTRACTOR with Provisions in Article **RELEASE OF LIENS OR CLAIMS,** and other Provisions as may be applicable, the OWNER shall pay to the CONTRACTOR all monies due him under the Provisions of these Contract Documents.

73. NO WAIVER OF RIGHTS

Neither the inspection by the OWNER, through the ENGINEER or any of his employees, nor any order by the OWNER for payment of money, nor any payment for, or acceptance of, the whole or any part of the work by the OWNER or ENGINEER, nor any extension of time, nor any possession taken by the OWNER or its employees, shall operate as a waiver of any Provision of this Contract, or any power herein reserved to the OWNER, or any right to damages herein Provided, nor shall any waiver of any breach in this Contract be held to be a waiver of any other or subsequent breach. Acceptance or final payment shall not be final and conclusive with regards to latent defects, fraud, or such gross mistakes as may amount to fraud, or as regards the OWNER's rights under the warranty.

74. ACCEPTANCE OF FINAL PAYMENT CONSTITUTES RELEASE

The acceptance by the CONTRACTOR of the final payment shall release the OWNER and the ENGINEER, as representatives of the OWNER, from all claims and all liability to the CONTRACTOR for all things done or furnished in connection with the work, and every act of the OWNER and others relating to or arising out of the work except claims Previously made in writing and still unsettled. No payment, however, final or otherwise, shall operate to release the CONTRACTOR or his Sureties from obligations under this Contract and the Performance Bond, Payment Bond, and other bonds and warranties, as herein provided.

SUPPLEMENTARY CONDITIONS

The General Conditions are hereby revised as follows:

ARTICLE 9 "ENGINEER"

Delete Article "ENGINEER" in its entirety and substitute the following:

The person or organization identified as such in the Contract Documents. The Term "ENGINEER" means BERMELLO AJAMIL & PARTNERS, INC. or his authorized representative.

ARTICLE 32 "CONTRACTOR, AN INDEPENDENT AGENT"

Add the following:

A. ASSIGNMENT OF CONTRACT

Assignment of any part or the whole of this Contract shall be subject to review and approval of the City Commission

ARTICLE 34 "INSURANCE & LIABILITY"

Delete Articles 34 A, B,C, D & E and substitute the following:

Contractor shall maintain limits no less than those stated below:

CONTRACTOR is to secure, pay for, and file with the City of Key West, prior to commencing any work under the Contract, all certificates for workers' compensation, public liability, and property damage liability insurance, and such other insurance coverages as may be required by specifications and addenda thereto, in at least the following minimum amounts with specification amounts to prevail if greater than minimum amounts indicated. Notwithstanding any other provision of the Contract, the CONTRACTOR shall provide the minimum limits of liability insurance coverage as follows:

Auto Liability	$1,000,000	Combined Single Limit
General Liability	$2,000,000	Aggregate (Per Project)
	$2,000,000	Products Aggregate
	$1,000,000	Any One Occurrence
	$1,000,000	Personal Injury
	$ 300,000	Fire Damage/Legal
Additional Umbrella Liability	$2,000,000	Occurrence / Aggregate

CONTRACTOR shall furnish an original Certificate of Insurance indicating, and such policy providing coverage to, City of Key West named as an additional insured on a PRIMARY and NON CONTRIBUTORY basis utilizing an ISO standard endorsement at least as broad as CG 2010 (11/85) or its equivalent, (combination of CG 20 10 07 04 and CG 20 37 07 04, providing

coverage for completed operations, is acceptable) including a waiver of subrogation clause in favor of City of Key West on all policies. CONTRACTOR will maintain the General Liability and Umbrella Liability insurance coverages summarized above with coverage continuing in full force including the additional insured endorsement until at least 3 years beyond completion and delivery of the work contracted herein.

Notwithstanding any other provision of the Contract, the CONTRACTOR shall maintain complete workers' compensation coverage for each and every employee, principal, officer, representative, or agent of the CONTRACTOR who is performing any labor, services, or material under the Contract. Further, CONTRACTOR shall additionally maintain the following minimum limits of coverage:

Bodily Injury Each Accident	$1,000,000
Bodily Injury by Disease Each Employee	$1,000,000
Bodily Injury by Disease Policy Limit	$1,000,000

CONTRACTOR's insurance policies shall be endorsed to give 30 days' written notice to the City of Key West in the event of cancellation or material change, using form CG 02 24, or its equivalent.

Certificates of Insurance submitted to the City of Key West will not be accepted without copies of the endorsements being requested. This includes additional insured endorsements, cancellation/material change notice endorsements, and waivers of subrogation.PLEASE ADVISE YOUR INSURANCE AGENT ACCORDINGLY.

CONTRACTOR will comply with any and all safety regulations required by any agency or regulatory body including but not limited to OSHA. CONTRACTOR will notify City of Key West immediately by telephone at (305) 809-3811 any accident or injury to anyone that occurs on the jobsite and is related to any of the work being performed by the CONTRACTOR.

Add the following Article:

G. SURETY AND INSURER QUALIFICATIONS

All bonds, insurance contracts, and certificates of insurance shall be either executed by or countersigned by a licensed resident agent of the Surety or insurance company, having his place of business in the State of Florida, and in all ways complying with the insurance laws of the State of Florida. Further, the said Surety or Insurance Company shall be duly licensed and qualified to do business in the State of Florida. If requested, Contractor shall Provide Proof of Florida Licensure for all insurance companies. The City of Key West shall be named as Additional Insured on the insurance certificates.

See sample insurance forms on next seven (7) pages

ACORD™ CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:	
	PHONE (A/C, No, Ext):	FAX (A/C, No):
	E-MAIL ADDRESS:	
	INSURER(S) AFFORDING COVERAGE	NAIC #
	INSURER A :	
INSURED **Vendor Sample**	INSURER B :	
	INSURER C :	
	INSURER D :	
	INSURER E :	
	INSURER F :	

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	GENERAL LIABILITY						EACH OCCURRENCE	$1,000,000
	X COMMERCIAL GENERAL LIABILITY						DAMAGE TO RENTED PREMISES (Ea occurrence)	$300,000
	CLAIMS-MADE X OCCUR	X	X				MED EXP (Any one person)	$
							PERSONAL & ADV INJURY	$1,000,000
							GENERAL AGGREGATE	$2,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER: POLICY PRO-JECT LOC						PRODUCTS - COMP/OP AGG	$2,000,000
								$
	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	$1,000,000
	X ANY AUTO						BODILY INJURY (Per person)	$
	ALL OWNED AUTOS / SCHEDULED AUTOS	X	X				BODILY INJURY (Per accident)	$
	X HIRED AUTOS / X NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$
								$
	X UMBRELLA LIAB X OCCUR						EACH OCCURRENCE	$,000,000
	EXCESS LIAB CLAIMS-MADE	X	X				AGGREGATE	$,000,000
	DED X RETENTION $							$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y/N						X WC STATU-TORY LIMITS OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? N (Mandatory in NH)	N/A	X				E.L. EACH ACCIDENT	$1,000,000
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$1,000,000
							E.L. DISEASE - POLICY LIMIT	$1,000,000
	Professional Liability (if applicable)						**Per Claim**	$1,000,000
							Aggregate	$1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

CERTIFICATE HOLDER

City of Key West
P.O. Box 1409
Key West, FL 33041-1409

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED – OWNERS, LESSEES OR CONTRACTORS – AUTOMATIC STATUS WHEN REQUIRED IN CONSTRUCTION AGREEMENT WITH YOU

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

A. **Section II – Who Is An Insured** is amended to include as an additional insured any person or organization for whom you are performing operations when you and such person or organization have agreed in writing in a contract or agreement that such person or organization be added as an additional insured on your policy. Such person or organization is an additional insured only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by:

1. Your acts or omissions; or
2. The acts or omissions of those acting on your behalf;

in the performance of your ongoing operations for the additional insured.

A person's or organization's status as an additional insured under this endorsement ends when your operations for that additional insured are completed.

B. With respect to the insurance afforded to these additional insureds, the following additional exclusions apply:

This insurance does not apply to:

1. "Bodily injury", "property damage" or "personal and advertising injury" arising out of the rendering of, or the failure to render, any professional architectural, engineering or surveying services, including:
   a. The preparing, approving, or failing to prepare or approve, maps, shop drawings, opinions, reports, surveys, field orders, change orders or drawings and specifications; or
   b. Supervisory, inspection, architectural or engineering activities.
2. "Bodily injury" or "property damage" occurring after:
   a. All work, including materials, parts or equipment furnished in connection with such work, on the project (other than service, maintenance or repairs) to be performed by or on behalf of the additional insured(s) at the location of the covered operations has been completed; or
   b. That portion of "your work" out of which the injury or damage arises has been put to its intended use by any person or organization other than another contractor or subcontractor engaged in performing operations for a principal as a part of the same project.

POLICY NUMBER:

COMMERCIAL GENERAL LIABILITY
CG 20 10 07 04

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED – OWNERS, LESSEES OR CONTRACTORS – SCHEDULED PERSON OR ORGANIZATION

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

SCHEDULE

Name Of Additional Insured Person(s) Or Organization(s):	Location(s) Of Covered Operations
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.	

A. **Section II – Who Is An Insured** is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by:

1. Your acts or omissions; or
2. The acts or omissions of those acting on your behalf;

in the performance of your ongoing operations for the additional insured(s) at the location(s) designated above.

B. With respect to the insurance afforded to these additional insureds, the following additional exclusions apply:

This insurance does not apply to "bodily injury" or "property damage" occurring after:

1. All work, including materials, parts or equipment furnished in connection with such work, on the project (other than service, maintenance or repairs) to be performed by or on behalf of the additional insured(s) at the location of the covered operations has been completed; or
2. That portion of "your work" out of which the injury or damage arises has been put to its intended use by any person or organization other than another contractor or subcontractor engaged in performing operations for a principal as a part of the same project.

POLICY NUMBER:

COMMERCIAL GENERAL LIABILITY
CG 20 37 07 04

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED – OWNERS, LESSEES OR CONTRACTORS – COMPLETED OPERATIONS

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

SCHEDULE

Name Of Additional Insured Person(s) Or Organization(s):	Location And Description Of Completed Operations
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.	

Section II – Who Is An Insured is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury" or "property damage" caused, in whole or in part, by "your work" at the location designated and described in the schedule of this endorsement performed for that additional insured and included in the "products-completed operations hazard".

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

EARLIER NOTICE OF CANCELLATION PROVIDED BY US

Number of Days Notice 30

For any statutorily permitted reason **other than nonpayment of premium**, the number of days required for notice of cancellation is increased to the number of days shown in the Schedule above.

If this policy is cancelled by us we will send the Named Insured and any party listed in the following schedule notice of cancellation based on the number of days notice shown above.

Schedule

Name of Person or Organization

Mailing Address

POLICY NUMBER:

COMMERCIAL GENERAL LIABILITY
CG 24 04 05 09

WAIVER OF TRANSFER OF RIGHTS OF RECOVERY AGAINST OTHERS TO US

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART
PRODUCTS/COMPLETED OPERATIONS LIABILITY COVERAGE PART

SCHEDULE

Name Of Person Or Organization:
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.

The following is added to Paragraph **8. Transfer Of Rights Of Recovery Against Others To Us** of **Section IV – Conditions:**

We waive any right of recovery we may have against the person or organization shown in the Schedule above because of payments we make for injury or damage arising out of your ongoing operations or "your work" done under a contract with that person or organization and included in the "products-completed operations hazard". This waiver applies only to the person or organization shown in the Schedule above.

WAIVER OF OUR RIGHT TO RECOVER FROM OTHERS ENDORSEMENT

We have the right to recover our payments from anyone liable for an injury covered by this policy. We will not enforce our right against the person or organization named in the Schedule. (This agreement applies only to the extent that you perform work under a written contract that requires you to obtain this agreement from us.)

This agreement shall not operate directly or indirectly to benefit anyone not named in the Schedule.

Schedule

This endorsement changes the policy to which it is attached and is effective on the date issued unless otherwise stated.

(The information below is required only when this endorsement is issued subsequent to preparation of the policy.)

Endorsement
Insured

Effective Policy No.

Endorsement No.
Premium

Insurance Company

Countersigned by_____

WC 00 03 13
(Ed. 4-84)

ARTICLE 35 “INDEMNITY”

Delete Article “INDEMNITY” in its entirety and substitute the following:

INDEMNITY

To the fullest extent permitted by law, the CONTRACTOR expressly agrees to indemnify and hold harmless the City of Key West, their officers, directors, agents, and employees (herein called the “indemnitees”) from liabilities, damages, losses and costs, including, but not limited to, reasonable attorney’s fees and court costs, such legal expenses to include costs incurred in establishing the indemnification and other rights agreed to in this Paragraph, to persons or property, to the extent caused by the negligence, recklessness, or intentional wrongful misconduct of the CONTRACTOR, its Subcontractors or persons employed or utilized by them in the performance of the Contract. Claims by indemnitees for indemnification shall be limited to the amount of CONTRACTOR’s insurance or $1 million per occurrence, whichever is greater. The parties acknowledge that the amount of the indemnity required hereunder bears a reasonable commercial relationship to the Contract and it is part of the project specifications or the bid documents, if any. The indemnification obligations under the Contract shall not be restricted in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the CONTRACTOR under workers’ compensation acts, disability benefits acts, or other employee benefits acts, and shall extend to and include any actions brought by or in the name of any employee of the CONTRACTOR or of any third party to whom CONTRACTOR may subcontract a part or all the Work. This indemnification shall continue beyond the date of completion of the work.

ARTICLE 39 "CODES, ORDINANCES, PERMITS, AND LICENSES"

Add the following:

A. NOISE ORDINANCE

City of Key West has a noise ordinance that allows working hours between 8:00 AM to 7:00 PM, Monday through Friday. No work should be performed during weekends or City Holidays, State Holidays and National Holidays. Any construction operations outside these hours and these days will require a variance from the City of Key West Commission.

B. "LICENSES"

THE BIDDER MUST BE A LICENSED CONTRACTOR BY THE STATE OF FLORIDA AND SUBMIT PROOF OF SUCH WITH THE BID.

1. Within 10 days of Notice of Award, the successful Bidder must represent that he holds all applicable, county, and City of Key West licenses and permits required to do business as a contractor with respect to the work described in the Contract Documents.

2. Further, the successful Bidder must, within 10 days of Notice of Award, furnish documentation showing that, as a minimum, he has complied with the provisions of Chapter 18 of the Code of Ordinances of the City of Key West to enter the Agreement contained in the Contract Documents.

3. Specifically, within 10 days after Notice of Award, the successful Bidder must demonstrate that he holds, as a minimum, the following licenses and certificates:

   a.) City of Key West Tax License Receipt;
   b.) A valid Certificate of Competency issued by the Chief Building Official of Key West, Florida
   c.) A valid occupational license issued by the City of Key West, Florida.

ARTICLE 40 “SUPERINTENDENCE”

Add the following sub article:

The CONTRACTOR shall keep at the project site, competent supervisory personnel, able to read, write and speak English to effectively communicate with City staff.

ARTICLE 42 "SAFETY"

Add the following sub article:

OCCUPATIONAL SAFETY AND HEALTH

The Contractor shall observe and comply with all applicable local, state, and federal occupational safety and health regulations during the prosecution of work under this Contract. In addition, full compliance by the Contractor with the U.S. Department of Labor's Occupational Safety and Health Standards, as established in Public Law 91-596, will be required under the terms of this Contract.

ARTICLE 43 "PROTECTION OF WORK AND PROPERTY"

Add the following Article:

HISTORIC PRESERVATION

The Contractor shall comply with Florida's Archives and Historic Act (Florida Statutes, Chapter 267) and the regulations of the local historic preservation board as applicable and protect against the potential loss or destruction of significant historical or archaeological data, sites, and properties in connection with the project.

ARTICLE 57 “OWNERS RIGHT TO TRANSFER EMPLOYMENT”

Add the following Article:

TERMINATION FOR CONVENIENCE AND RIGHT OF SUSPENSION

A. Owner shall have the right to terminate this Contract without cause by written notice of Termination to the Contractor. In the event of such termination for convenience, the Contractor’s recovery against the Owner shall be limited to that portion of the Contract amount earned through the date of termination, together with any retainage withheld and reasonable termination expenses incurred. Contractor shall not be entitled to any other or further recovery against the Owner, including, but not limited to, damages or any anticipated profit on portions of the Work not performed.

B. The Owner shall have the right to suspend all or any portions of the Work upon giving the Contractor prior written notice of such suspension. If all or any portion of the Work is so suspended, the Contractor shall be entitled to reasonable costs, expenses and time extension associated with the suspension.

ARTICLE 60 "LIQUIDATED DAMAGES"

Delete Article "LIQUIDATED DAMAGES" in its entirety and substitute the following:
LIQUIDATED DAMAGES

Should the Contractor fail to complete the work or any part thereof in the time agreed upon in the Contract Documents or within such extra time as may have been allowed for delays by extensions granted as provided in the Contract, the Contractor shall reimburse the Owner for the additional expense and damage for each calendar day that project outlined in Contract Documents remains uncompleted after the completion date. Liquidated damages shall be assessed. It is agreed that the amount of such additional expense and damage incurred by reason of failure to complete the work is the per diem rate as stipulated in the Bid. The said amount is hereby agreed upon as a reasonable estimate of the costs which may be accrued by the Owner after the expiration of the time of completion. It is expressly understood and agreed that this amount is not to be considered in the nature of a penalty but as liquidated damages, which have accrued against the Contractor. The Owner shall have the right to deduct such damages from any amount due or that may become due the Contractor or the amount of such damages shall be due and collectible from the Contractor.

ARTICLE 68 “PAYMENT”

Sub article C. “COST REIMBURSEMENT WORK”

Delete the third & fourth paragraph in its entirety & substitute the following;

In addition to 1 through 5 above, an added fixed fee of 15 percent (%) for general overhead & profit shall be allowed for the CONTRACTOR (or approved SUBCONTRACTOR) executing the Cost Reimbursement work.

An additional fixed fee of 5 % will be allowed the CONTRACTOR for the administrative handling of portions of the work that are executed by an approved SUBCONTRACTOR. No additional fixed fee will be allowed for the administrative handling of work executed by the SUBCONTRACTOR of a SUBCONTRACTOR.

ARTICLE 69 "PARTIAL PAYMENTS"

Delete the first paragraph of Sub Article B. "ESTIMATE" and substitute the following:

No more than once each month the Contractor shall submit to the ENGINEER a detailed estimate of the amount earned during the preceding month for the separate portions of the work and request payment. As used in this Article the words "amount earned" means the value, on the date of the estimate, for partial payment of the work completed in accordance with the Contract Documents and the value of approved materials delivered to the project site suitably stored and protected prior to incorporation into the work. Payment will be made by the Owner to the Contractor within 40 days receipt of the written recommendation of payment from the ENGINEER.

Sub Article C. "DEDUCTION FROM ESTIMATE

Delete third sentence in its entirety and substitute add the following;

1. When the work is 90 per cent complete, the OWNER may reduce the retainage to 5 percent of the dollar value of all work satisfactorily completed to date provided the CONTRACTOR is making satisfactory progress and there is no specific cause for greater retainage.

Delete Sub article E. "PAYMENT" in its entirety and substitute the following:

After deducting the retainage and the amount of all previous partial payments made to the Contractor from the amount earned the amount due will be made payable to the Contractor. Recommendations for payment received by the Owner less than 40 days prior to the scheduled day for payment will not be processed or paid until the following month.

ARTICLE 72 "FINAL PAYMENT"
Delete Article "FINAL PAYMENT" in its entirety and substitute the following:

FINAL PAYMENT

Upon completion of the work the Contractor shall notify the ENGINEER, in writing, that he has completed it and shall request final payment. The Contractor shall be responsible for keeping an accurate and detailed record of his actual construction. Upon completion of construction and before final acceptance and payment the Contractor shall furnish the ENGINEER as-built drawings of his construction. Upon receipt of a request for final payment and the as-built drawings the ENGINEER will inspect and, if acceptable, submit to the Owner his recommendation as to acceptance of the completed work and as to the final estimate of the amount due the Contractor. Upon approval of this

final estimate by the Owner and compliance by the Contractor with provisions in Article RELEASE OF LIENS OR CLAIMS, and other provisions as may be applicable, the Owner shall pay to the Contractor all monies due him under the provisions of these Contract Documents.

A. Acceptance and Final Payment

Whenever the Contractor has completely performed the work provided for under the Contract and the ENGINEER has performed a final inspection and made final acceptance and subject to the terms of the ENGINEER will prepare a final estimate showing the value of the work as soon as the ENGINEER makes the necessary measurements and computations. The ENGINEER will correct all prior estimates and payments in the final estimate and payment. The OWNER will pay the estimate, less any sums that the OWNER may have deducted or retained under the provisions of the Contract, as soon as practicable after final acceptance of the work, provided the Contractor has met the requirements of (1) through (4) below.

1. The Contractor has agreed in writing to accept the balance due or refund the overpayment, as determined by the OWNER, as full settlement of his account under the Contract and of all claims in connection therewith, or the Contractor, accepted the balance due or refunded the overpayment, as determined by the OWNER, with the stipulation that his acceptance of such payment or the making of such refund does not constitute any bar, admission, or estoppel, or have any effect as to those payments in dispute or the subject of a pending claim between the Contractor and the OWNER. To receive payment based on a FINAL PAYMENT CERTIFCATE, The Contractor further agrees, by submitting a FINAL PAYMENT CERTIFICATE that any pending or future arbitration claim or suit is limited to those particulars, including the itemized amounts, defined in the original FINAL PAYMENT CERTIFICATE , and that he will commence with any such arbitration claim or suit within 15 calendar days from and after the time of final PAYMENT of the work and that his failure to file a formal claim within this period constitutes his full acceptance of the ENGINEER's final estimate and payment. The overpayment refund check from the Contractor, if required, will be considered a part of any Acceptance Letter executed.

2. The Contractor has properly maintained the project, as specified hereinbefore.

3. The Contractor has furnished a sworn affidavit to the effect that the Contractor has paid all bills and no suits are pending (other than those exceptions listed, if any) in connection with work performed under the Contract and that the Contractor has not offered or made any gift or gratuity to, or made any financial transaction of any nature with, any employee of the OWNER in the performance of the Contract.

4. Final payment will not be released until the City receives Certified As-built drawings in Auto Cad & Adobe format as well as:

As-Built Drawing Standards:

All supplied data collections, as-builts, drawings and files to be compatible with esri ArcGIS 10.2.2 Software. The current computing environment consists of:

- Microsoft SQL Server - Windows 7/Server 2008 - ESRI GIS Platform

Interfaces and Integrations:

The City of Key West uses a number of software applications critical to its core operation and mission. The proposed mobile asset data collection solution will need to interface or integrate with these existing platforms. - Arc Collector-ArcGIS Online - ArcMap 10.2

END OF SECTION

PART 4

GENERAL REQUIREMENTS

SECTION 01001
GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 PROJECT DESCRIPTION

A. A brief description of the work is stated in the Invitation to Bid. To determine the full scope of the project or of any part of the project, coordinate the applicable information in the several parts of these Contract Documents.

1.2 MOBILIZATION AND DEMOBILIZATION

A. Contractor shall be responsible for mobilization and demobilization of labor, materials and equipment. Payment for mobilization and demobilization will be included in the lump sum price indicated in the BID. Parking for vehicles used on site will be determined by the ENGINEER prior to mobilization.

B. DAILY REPORTS
   1) The CONTRACTOR shall submit daily reports of construction activities for each site, including non-work days. The report shall include:
      a) Manpower, number of workers by craft
      b) Quality Control
      c) Equipment on the Project
      d) Major deliveries
      e) Activities worked
      f) New problems
      g) Other pertinent information
   2) A similar report shall be submitted for/by each Subcontractor.
   3) The reports shall be submitted to the ENGINEER upon request.

1.3 SCHEDULING

A. Prior to starting the work, confer with the ENGINEER and Owner's representative to develop an approved work schedule. Which will permit the surrounding facilities to function as normally as practical. It may be necessary to do certain parts of the work outside normal working hours to avoid undesirable conditions. The Contractor shall do this work at such times and at no additional cost to the Owner.

B. SPECIAL EVENTS: Contractor may be asked to stop work during special events.

1.4 COORDINATION

A. Contractors shall cooperate in the coordination of their separate activities in a manner that will provide the least interference with the Owner's operations and other contractors and utility companies working in the area, and in the interfacing and connection of the separate elements of the overall project work.

B. If any difficulty or dispute should arise in the accomplishment of the above, the problem shall be brought immediately to the attention of the ENGINEER.

C. CONTRACTOR shall notify all residents and proprietors adjacent to construction site of work to be performed, more specifically the notice shall state the day and time construction will begin, the name and phone number of the Contractor's representative responsible for the completion of the proposed improvements. Notice shall also include the Owner's representative for the project.

1.5 SITE INVESTIGATION AND REPRESENTATION

A. The Contractor acknowledges satisfaction as to the nature and location of the work, the general and local conditions, particularly those bearing upon availability of transportation, access to the site, disposal, handling and storage of materials, availability of labor, water, electric power, roads, and uncertainties of weather, or similar physical conditions at the site, the conformation and conditions at the site, the character of equipment and facilities needed preliminary to and during the prosecution of the work, and all other matters which can any way affect the work or the cost thereof under this Contract.

B. The Contractor further acknowledges satisfaction as to character, quality, and quantity of surface and subsurface materials to be encountered from his inspection of the site and from reviewing any available records of exploratory work furnished by the Owner or included in these Documents. Failure by the Contractor to become acquainted with the physical conditions of the site and all available information will not relieve the Contractor from responsibility for properly estimating the difficulty or cost of successfully performing the work.

C. The Contractor warrants that as a result of examination and investigation of all the aforesaid data, the contractor can perform the work in a good and workmanlike manner and to the satisfaction of the Owner.

D. The Owner assumes no responsibility for any representations made by any of its officers or agents during or prior to the execution of this Contract, unless (1) such representations are expressly stated in the Contract, and (2) the Contract expressly provides that the responsibility therefore is assumed by the Owner.

1.6 INFORMATION ON SITE CONDITIONS

A. General: Any information obtained by the ENGINEER regarding site conditions, subsurface information, water level, existing construction of site facilities as applicable, and similar data will be available for inspection at the office of the ENGINEER upon request. Such information is offered as supplementary information only. Neither the ENGINEER nor the Owner assumes any responsibility for the completeness or interpretation of such supplementary information.

B. The Contractor shall provide a color audio-video recording showing the entire preconstruction site. All videos shall be taken by a professional commercial video photographer. The video photographer shall be an established enterprise that routinely provides these services. The videos shall be in DVD format or .wav files on removable USB drive, indicating the date, project name, and a brief description of the location where the video was taken. The Contractor shall submit one (1) copy of the preconstruction audio-video to the OWNER.

1.7 DIFFERING SUBSURFACE CONDITIONS

A. The ENGINEER shall investigate such conditions promptly and following this investigation, the Contractor shall proceed with the work, unless otherwise instructed by the ENGINEER. If the ENGINEER finds that such conditions do so materially differ and cause an increase or decrease in the cost of, or in the time required for performing the work, the ENGINEER will recommend to the Owner the amount of adjustment in cost and time he considers reasonable. The Owner will make the final decision on all Change Orders to the Contract regarding any adjustment in cost or time for completion.

1.8 UTILITIES

A. During excavation, the Contractor shall be responsible for determining, at his cost, the locations of all known utilities in the project area.

B. Contractor shall notify utility location service (e.g. Call Sunshine 1-800-432-4770) a minimum for 48 hours prior to work order mobilization. Assigned notification number shall be maintained at the job site at all times and recorded in the daily reports.

1.9 CONTRACTOR'S RESPONSIBILITY FOR UTILITY PROPERTIES AND SERVICE

A. Where the Contractor's operations could cause damage or inconvenience to telephone, television, gas, water, sewer, or irrigation systems, the operations shall be suspended until all arrangements necessary for the protection of these utilities and services have been made by the Contractor.

B. Notify all utility offices, which are affected by the construction operation at least 48 hours in advance. Under no circumstances expose any utility without first obtaining permission from the appropriate agency. Once permission has been granted, locate, expose, and provide temporary support for all existing underground utilities.

C. The Contractor shall be solely and directly responsible to the Owner and operators of such properties for any damage, injury, expense, loss, inconvenience, delay, suits, actions, or claims of any character brought because of any injuries or damage which may result from the construction operations under this Contract

D. Neither the Owner nor its Officers or agents shall be responsible to the Contractor for damages as a result of the Contractor's failure to protect utilities encountered in the work.

E. In the event of interruption to domestic water, sewer, storm drain, or other utility services as a result of accidental breakage due to construction operations, promptly notify the proper authority. Cooperate with said authority in restoration of service as promptly as possible and bear all costs of repair. In no case shall interruption of any water or utility service be allowed to exist outside working hours unless prior approval is granted.

F. In the event the Contractor encounters water service lines that interfere with trenching, he may, by obtaining prior approval of the property owner, Florida Keys Aqueduct Authority

(FKAA), or Fire Department as applicable, and the ENGINEER, cut the service dig through, and restore service with similar and equal materials at the Contractor's expense.

G. The Contractor shall replace, at his own expense, all existing utilities or structures removed or damaged during construction, unless otherwise provided for in these Contract Documents or ordered by the ENGINEER.

1.10 TEMPORARY WATER

A. The Contractor shall make his own arrangements to obtain suitable water for any need and shall pay all costs.

1.11 TEMPORARY ELECTRIC POWER

A. The Contractor shall make his own arrangements to obtain and pay for electrical power used until final acceptance by the Owner.

1.12 SAFETY REQUIREMENTS FOR TEMPORARY ELECTRIC POWER

A. Temporary electric power installation shall meet the construction Safety requirements of OSHA, State, and other governing agencies.

1.13 SANITARY FACILITIES

A. The Contractor shall provide and maintain sanitary facilities for his employees and his subcontractor's employees that will comply with the regulations of the local and State Departments of Health and as directed by the Owner.

1.14 STORAGE OF MATERIALS

A. Materials shall be so stored as to ensure the preservation of their quality and fitness for the work. When considered necessary, they shall be placed on wooden platforms or other clean hard surfaces and not on the ground. Stored materials shall be located so as to facilitate prompt inspection. Stored materials on city property must safe and secured from the general public and if necessary they must be fitted with lights at night. Private property shall not be used for storage purposes without the written permission of the owner or lessee. Materials shall not be stored where access to any structure, plot, or road is blocked. Location of stored materials approved by the ENGINEER or his designee.

B. Delicate instruments and materials subject to vandalism shall be placed under lock cover and, if necessary, provided with temperature control as recommended by the manufacturer.

1.15 CONSTRUCTION SAFETY PROGRAM

A. The Contractor shall develop and maintain for the duration of this Contract, a safety program that will effectively incorporate and implement all required safety provisions. The Contractor shall appoint an employee who is qualified and authorized to supervise and enforce compliance with the safety program.

B. The duty of the ENGINEER to conduct construction review of the Contractor's performance is not intended to include a review or approval of the adequacy of the Contractor's safety

supervisor, the safety program or any safety measures taken in, on, or near the construction site.

C. The Contractor shall do all work necessary to protect the public from hazards, including, but not limited to, surface irregularities, or unramped grade changes on pedestrian walkways and docks. Barricades, lights, and proper signs shall be furnished in sufficient amount to safeguard the public and the work.

D. The performance of all work shall be in accordance with the applicable governing safety authorities.

1.16 ACCIDENT REPORTS

A. If death or serious injuries or serious damages are caused; the Contractor must promptly report by telephone or messenger to the ENGINEER. In addition, the Contractor must promptly report in writing to the ENGINEER all accidents whatsoever arising out of or in connection with, the performance of the work whether on, or adjacent, to the site, giving full details and statements of witnesses.

B. If a claim is made against the Contractor or any subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the ENGINEER, giving full details of the claim.

1.17 FIRE PREVENTION AND PROTECTION

A. The Contractor shall perform all work in a fire-safe manner and shall supply and maintain on the site adequate fire-fighting equipment capable of extinguishing incipient fires. The Contractor shall comply with applicable federal, state, and local fire-prevention regulations. Where these regulations do not apply, applicable parts of the National Fire Prevention Standard for Safeguarding Building Construction Operations (NFPA No. 241) shall be followed.

1.18 SITE RESTORATION AND CLEANUP:

A. At all times during the work keep the premises clean and orderly and upon completion of daily work repair all damage caused by equipment and leave the project free of rubbish or excess materials of any kind.

B. Stockpile excavated materials in a manner that will cause the least damage to adjacent lawns, grassed areas, gardens, shrubbery, or fences regardless of whether these are on private property, or State, County, or City rights-of-way. Remove all excavated materials from grassed and planted areas, and leave these surfaces in a condition equivalent to their original condition.

1.19 FINISHING OF SITE AND STORAGE AREAS

A. Upon completion of the project, all areas used by the Contractor shall be properly cleared of all temporary structures, rubbish and waste materials and properly graded to drain and blend in with the abutting property. Areas used for the deposit of waste materials shall be finished to properly drain and blend in with the surrounding terrain.

1.20 AREA CLEANUP DURING CONSTRUCTION

A. Thoroughly clean all spilled dirt, gravel, sand or other foreign materials caused by the construction operations from all streets and roads, grass, pathways, docks or concrete walkways and from adjacent areas at the conclusion of each day's operation. Truck or equipment wash down is not to be performed on City Property.

1.21 PREVENTION

A. Applicable environmental regulations shall be strictly adhered to.

1.22 SUBMITTALS

A. See Submittals section of the specifications

1.23 PAYMENT

A. The cost of the work in this section is considered incidental to the contract.

END OF SECTION

SECTION 01010
SCOPE OF WORK

The project contemplated consists of providing all materials, equipment and labor necessary to install the Smathers Beach Bathroom facility on the beach; including the installation of a sanitary lift station across South Roosevelt in the City's bridle path.

1.1 DESCRIPTION

Furnish and install a pre-engineered/pre-manufactured bathroom facility on Smathers Beach including a sanitary lift station installed across South Roosevelt Boulevard as detailed in the specifications and drawing for Smathers Beach Bathroom / ITB 17-018 including all site work and necessary appurtenances, record drawings, and incidental work to provide a complete and serviceable project identified as:

B. **ITB 17-018 - SMATHERS BEACH BATHROOM**

C. Related requirements in other parts of the Contract Documents: Include but not limited to:

1. General and Supplementary Conditions of the Contract for Construction.

1.2 CONTRACTOR'S DUTIES:

A. In addition to provisions stipulated in other portions of the Contract Documents, the Contractor shall:

1. Secure permits as necessary for proper execution and completion of the work. The City will secure a Florida Department of Transportation utility permit to cross South Roosevelt Boulevard for lift station. Contractor must indemnify the Florida Department of Transportation (FDOT). All conditions of the permit must be adhered to by the contractor.

2. Notify (in writing) all vendors, residents and proprietors adjacent to construction site of work to be performed, more specifically the notice shall state the day and time construction will begin, hours of work, the name and phone number of the Contractor's Superintendent and an end date for the project.

B. The Contractor shall be totally responsible for securing (except FDOT) and complying with all, required permits and payment of associated fees. Contractor shall ensure that construction complies with all applicable local, state, and federal codes.

C. Provide an experienced, qualified, and competent Superintendent able to read, write and speak English to oversee the work and perform quality assurance inspections. Prior to starting construction, the proposed Superintendent's qualifications shall be submitted in writing to the City for approval. The approved Superintendent shall be expected to remain for the duration of the Project, unless the City or ENGINEER deem him/her inadequate and requests his/her removal or the Contractor cannot continue his services to the Project for a reason or reasons that shall be communicated in writing to the City.

D. The Superintendent shall provide to the City, upon request, Construction Reports for each day

of construction, the reports shall be in English, legible, and signed. Contractor shall provide PDF copies monthly. Reports shall include quantity control checks.

E. It shall be the Contractor's responsibility to comply with the City's Ordinance

Chapter 26 Environment, Article IV. Sound Control below:

Sec. 26-193. - Exceptions.

The prohibitions contained in this article shall not apply to the following:

(3) Construction/demolition. Sound levels produced from tools and equipment in commercial construction, demolition, drilling, or reasonably similar activities. However, such sound levels are limited to the hours of 8:00 a.m. to 7:00 p.m., Monday through Friday, and 9:00 a.m. to 5:00 p.m. on Saturday. The tools and equipment must be muffled and maintained equal to the functional standards of the industry. No exceptions contained in this subsection shall apply on Thanksgiving Day, Christmas Day and New Year's Day.

F. The Contractors is responsible for the installation of all building, concrete walkways, lift station and all associated items used in the completion of the project. Contractor is responsible for all costs associated with the disposal of materials and must dispose of in an environmentally responsible manner.

G. The Contractor shall provide material safety data sheets (2 copies) for chemicals, paints, coatings and materials used on-site prior to initiation of work.

1.3 CONTRACTOR'S USE OF PREMISES

A. Work shall be scheduled as to not interfere with on-going area activities.

B. Coordinate use of premises and requirements for security under direction of City.

C. Assume full responsibility for the protection and safekeeping of products, under this Contract, stored on the site.

D. Obtain and pay for the use of additional storage or work areas needed for operation.

1.4 MAINTENANCE OF EXISTING UTILITIES OPERATION

A. Provide at least three weeks' notice prior to interruption of utility services for temporary or permanent connections.

B. Keep interruption of utility services, and utility outages during disconnection, moving, and reconnection to a minimum.

C. Keys Energy shall be notified two weeks in advance in writing by the contractor for any KEYS support equipment required by the Contractor during construction. No additional payment will be paid for this coordination.

END OF SECTION

SECTION 01300
SUBMITTALS

PART 1 - GENERAL

1.1 GENERAL

A. Inquiries: Direct to ENGINEER regarding procedure, purpose, or extent of Submittal.

B. Submittal Submission Procedures: As provided in General Conditions, as specified herein, and as may otherwise be established during the preconstruction conference.

C. OWNER's Authorization: At any time, OWNER may authorize changes to procedures and requirements for Submittals, as necessary to accomplish specific purpose of each Submittal. Such authorization will be by Field Order or Work Change Directive.

D. Timeliness: Make submissions in accordance with requirements of individual Specification sections, as shown on the current accepted schedule of Submittals submissions, and in such sequence as to cause no delay in Work or in work of other contractors.

E. Identification of Submittals:

1. Complete, sign, and transmit with each Submittal package, one Transmittal of CONTRACTOR's Submittal Form.
2. Identify each Submittal with numbering and tracking system reviewed by ENGINEER:
    a. Sequentially number each Submittal.
    b. Resubmission of a Submittal will have original number with sequential alphabetic suffix.
3. Show date of submission and dates of previous submissions.
4. Show Project title and OWNER's contract identification and contract number.
5. Show names of CONTRACTOR, Subcontractor or Supplier, and manufacturer as appropriate.
6. Identify, as applicable, Contract Document section and paragraph to which Submittal applies.
7. Clearly identify revisions from previous submissions.

F. Incomplete Submittal Submissions:

1. At ENGINEER's sole discretion, ENGINEER will either (i) return the entire Submittal for CONTRACTOR's revision/correction and resubmission, or (ii) retain portions of the Submittal and request submission/resubmission of specified items or as noted thereon.

2. Submittals which do not clearly bear CONTRACTOR's specific written indication of CONTRACTOR review and approval of Submittal or which are transmitted with an unsigned or uncertified submission form or as may otherwise be required under Contract Documents, will be returned to CONTRACTOR unreviewed for resubmission in accordance with Contract Documents.

3. Delays, re-sequencing or other impact to Work resulting from the CONTRACTOR’s submission of unchecked or unreviewed, incomplete, inaccurate or erroneous, or nonconforming Submittals,

which will require CONTRACTOR's resubmission of a Submittal for ENGINEER's review, shall not constitute a basis of claim for adjustment in Contract Price or Contract Times.

G. Non-specified Submissions: Submissions not required under these Contract Documents and not shown on schedule of Submittals submissions will not be reviewed and will be returned to CONTRACTOR.

H. Transmit submittals in accordance with current accepted schedule of Submittal submissions, and deliver the ENGINEER designated by the ENGINEERing Department of the City of Key West.

I. Disposition of Submittals: As specified herein for administrative Submittals. ENGINEER will review, stamp, and indicate requirements for resubmission or acceptance on Submittal as follows:

1. No Exceptions Taken.

2. Reviewed as Noted:
   a. Reference the General Conditions for intent.
   b. CONTRACTOR may proceed to perform Submittal related Work.
   c. One copy for ENGINEER’s file.
   d. One copy returned to CONTRACTOR.

3. Revise and Resubmit (Revise/Correct or Develop Replacement and Resubmit):
   a. Revise/correct in accordance with ENGINEER's comments and resubmit.
   b. One copy to ENGINEER's file.
   c. One copy returned to CONTRACTOR appropriately annotated.

J. Payment for the work in this section will be incidental to the contract.

END OF SECTION

PART 5

TECHNICAL SPECIFICATIONS

SECTION 000003
TABLE OF CONTENTS

END OF SECTION 000003

SECTION 033000
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:

1. Footings.
2. Slabs-on-grade.
3. Suspended slabs.
4. Building frame members.
5. Building walls.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

D. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.

1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and installing and removing reshoring.

E. Welding certificates.

F. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.

2. Admixtures.
3. Form materials and form-release agents.
4. Steel reinforcement and accessories.
5. Fiber reinforcement.
6. Curing compounds.
7. Bonding agents.
8. Adhesives.
9. Vapor retarders.
10. Joint-filler strips.
11. Repair materials.

G. Floor surface flatness and levelness measurements to determine compliance with specified tolerances.

H. Field quality-control test reports.

I. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Testing Agency Qualifications: An independent agency, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
2. 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.

D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

E. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel."

F. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301, “Specification for Structural Concrete.”
2. ACI 117, “Specifications for Tolerances for Concrete Construction and Materials.”

G. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

H. Mockups: Cast concrete slab-on-grade and formed-surface panels to demonstrate typical joints, surface finish, texture, tolerances, and standard of workmanship.

I. Preinstallation Conference: Conduct a conference at the Project site prior to placing any concrete.

1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:

    a. Contractor's superintendent.
    b. Independent testing agency responsible for concrete design mixtures.
    c. Ready-mix concrete manufacturer.
    d. Concrete subcontractor.

2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, forms and form removal limitations, shoring and reshoring procedures, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The following requirements apply to product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
2. Products: Subject to compliance with requirements, provide one of the products specified.
3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

4. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.
2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:

a. High-density overlay, Class 1 or better.
b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
c. Structural 1, B-B or better; mill oiled and edge sealed.
d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

D. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.

E. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch minimum.

F. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

G. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

H. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.3 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.

C. Deformed-Steel Wire: ASTM A 496.

D. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.

E. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.

2.4 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut bars true to length with ends square and free of burrs.

B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.5 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, Type I gray.

a. Fly Ash: ASTM C 618, Class C.

B. Silica Fume: ASTM C 1240, amorphous silica.

C. Normal-Weight Aggregates: ASTM C 33, Class 3S coarse graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.

1. Maximum Coarse-Aggregate Size 3/4 inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D. Water: ASTM C 94/C 94M and potable.

2.6 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

C. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494/C 494M, Type C.

1. Products:

a. Boral Material Technologies, Inc.; Boral BCN.
b. Euclid Chemical Company (The); Eucon CIA.
c. Grace Construction Products, W. R. Grace & Co.; DCI.
d. Master Builders, Inc.; Rheocrete CNI.
e. Sika Corporation; Sika CNI.

D. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.

1. Products:

a. Axim Concrete Technologies; Catexol 1000CI.
b. Boral Material Technologies, Inc.; Boral BCN2.
c. Cortec Corporation; MCI 2000.
d. Grace Construction Products, W. R. Grace & Co.; DCI-S.
e. Master Builders, Inc.; Rheocrete 222+.
f. Sika Corporation; FerroGard-901.

2.7 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

1. Products:

a. Axim Concrete Technologies; Cimfilm.
b. Burke by Edoco; BurkeFilm.
c. ChemMasters; Spray-Film.
d. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Aquafilm.
e. Dayton Superior Corporation; Sure Film.

f. Euclid Chemical Company (The); Eucobar.
g. Kaufman Products, Inc.; Vapor Aid.
h. Lambert Corporation; Lambco Skin.
i. Sika Corporation, Inc.; SikaFilm.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

1. Products:

a. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
b. Burke by Edoco; Aqua Resin Cure.
c. ChemMasters; Safe-Cure Clear.
d. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; W.B. Resin Cure.
e. Dayton Superior Corporation; Day Chem Rez Cure (J-11-W).
f. Euclid Chemical Company (The); Kurez DR VOX.
g. Kaufman Products, Inc.; Thinfilm 420.
h. Lambert Corporation; Aqua Kure-Clear.

F. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.

1. Products:

a. Anti-Hydro International, Inc.; AH Clear Cure WB.
b. Burke by Edoco; Spartan Cote WB II.
c. ChemMasters; Safe-Cure & Seal 20.
d. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Cure and Seal WB.
e. Dayton Superior Corporation; Safe Cure and Seal (J-18).
f. Euclid Chemical Company (The); Aqua Cure VOX.
g. Kaufman Products, Inc.; Cure & Seal 309 Emulsion.
h. Lambert Corporation; Glazecote Sealer-20.

G. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, 18 to 25 percent solids, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.

1. Products:

a. Burke by Edoco; Spartan Cote WB II 20 Percent.
b. ChemMasters; Safe-Cure Clear.

c. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; High Seal.
d. Dayton Superior Corporation; Safe Cure and Seal (J-19).
e. Euclid Chemical Company (The); Diamond Clear VOX.
f. Kaufman Products, Inc.; SureCure Emulsion.
g. Lambert Corporation; Glazecote Sealer-20.

H. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

1. Products:

a. Burke by Edoco; Cureseal 1315.
b. ChemMasters; Spray-Cure & Seal Plus.
c. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Sealcure 1315.
d. Dayton Superior Corporation; Day-Chem Cure and Seal (J-22UV).
e. Euclid Chemical Company (The); Super Diamond Clear.
f. Kaufman Products, Inc.; Sure Cure 25.
g. Lambert Corporation; UV Super Seal.

I. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

1. Products:

a. Burke by Edoco; Cureseal 1315 WB.
b. ChemMasters; Polyseal WB.
c. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Sealcure 1315 WB.
d. Euclid Chemical Company (The); Super Diamond Clear VOX.
e. Kaufman Products, Inc.; Sure Cure 25 Emulsion.
f. Lambert Corporation; UV Safe Seal.

2.8 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.

B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80.

C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

E. Reglets: Fabricate reglets of not less than 0.0217-inch- thick, galvanized steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

F. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than 0.0336 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.9 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

2.10 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash: 25 percent.
2. Combined Fly Ash and Pozzolan: 25 percent.
3. Ground Granulated Blast-Furnace Slag: 50 percent.
4. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.

5. Silica Fume: 10 percent.
6. Combined Fly Ash, Pozzolans, and Silica Fume: 35 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.
7. Combined Fly Ash or Pozzolans, Ground Granulated Blast-Furnace Slag, and Silica Fume: 50 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.

D. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

E. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.11 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: as indicated on drawings.
2. Slump Limit: 5 inches, plus or minus 1 inch.
3. Air Content: 4-1/2 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.
4. Air Content: 5 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.

B. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: as indicated on drawings.
2. Slump Limit: 5 inches, plus or minus 1 inch.
3. Air Content: 4-1/2 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.
4. Air Content: 5 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.
5. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.

C. Suspended Slabs: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: as indicated on drawings.
2. Slump Limit: 5 inches, plus or minus 1 inch.
3. Air Content: 4-1/2 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.

4. Air Content: 5 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.
5. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.

D. Building Frame Members: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: as indicated on drawings.
2. Slump Limit: 5 inches, plus or minus 1 inch.
3. Air Content: 4-1/2 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.
4. Air Content: 5 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.

2.12 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.13 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:

1. Class A, 1/8-inch for smooth-formed finished surfaces.
2. Class B, 1/4 inch, Class C, 1/2 inch, Class D, 1 inch for rough-formed finished surfaces.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

1. Install keyways, reglets, recesses, and the like, for easy removal.
2. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Do not chamfer exterior corners and edges of permanently exposed concrete.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
3. Install dovetail anchor slots in concrete structures as indicated.

3.3 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.

2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 SHORES AND RESHORES

A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.

1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.

B. In multistory construction, extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.

C. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.5 VAPOR RETARDERS

A. Plastic Vapor Retarders: Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches and seal with manufacturer's recommended tape.

B. Bituminous Vapor Retarders: Place, protect, and repair vapor retarders according to manufacturer's written instructions.

C. Granular Course: Cover vapor retarder with fine-graded granular material, moisten, and compact with mechanical equipment to elevation tolerances of plus 0 inch or minus 3/4 inch.

1. Place and compact a 1/2-inch- thick layer of fine-graded granular material over granular fill.

3.6 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

1. Weld reinforcing bars according to AWS D1.4, where indicated.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.7 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-third of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.8 WATERSTOPS

A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions.

B. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

3.9 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.
5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

G. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.10 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces to be covered with a coating or covering material applied directly to concrete.

C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching

adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.11 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces indicated.

C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces indicated.

2. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-foot- long straightedge resting on 2 high spots and placed anywhere on the surface does not exceed 1/4 inch.

D. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated. While concrete is still plastic, slightly scarify surface with a fine broom.

1. Comply with flatness and levelness tolerances for trowel finished floor surfaces.

E. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.12 ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations,

complying with diagrams or templates from manufacturer furnishing machines and equipment.

3.13 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

    a. Water.
    b. Continuous water-fog spray.
    c. Cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

    a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
    b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
    c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project..

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

a. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.14 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete, but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.

5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.15 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing and Inspecting: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.

    a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

3. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
4. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

5. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
6. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
7. Compression Test Specimens: ASTM C 31/C 31M.
   a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
   b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.

8. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
   a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
   b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
10. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
11. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
12. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
13. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
14. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
15. Correct deficiencies in the Work that test reports and inspections indicate dos not comply with the Contract Documents.

END OF SECTION 033000

SECTION 03 41 00
PRECAST STRUCTURAL CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes precast structural concrete hollow-core planks.

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design precast structural concrete, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance: Precast structural concrete units and connections shall withstand design loads indicated within limits and under conditions indicated.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each precast concrete mixture.

C. Shop Drawings: Include member locations, plans, elevations, dimensions, shapes and sections, openings, support conditions, and types of reinforcement, including special reinforcement. Detail fabrication and installation of precast structural concrete units.

D. Delegated-Design Submittal: For precast structural concrete indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

E. Qualification Data: For Installer and fabricator.

F. Welding certificates.

G. Material certificates.

H. Material test reports.

I. Source quality-control reports.

J. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm that assumes responsibility for engineering precast structural concrete units to comply with performance requirements. Responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

B. Design Standards: Comply with ACI 318 and design recommendations in PCI MNL 120, "PCI Design Handbook - Precast and Prestressed Concrete," applicable to types of precast structural concrete units indicated.

C. Quality-Control Standard: For manufacturing procedures and testing requirements, quality-control recommendations, and dimensional tolerances for types of units required, comply with PCI MNL 116, "Manual for Quality Control for Plants and Production of Structural Precast Concrete Products."

D. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D.1.1M, "Structural Welding Code - Steel."
2. AWS D1.4, "Structural Welding Code - Reinforcing Steel."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Support units during shipment on nonstaining shock-absorbing material in same position as during storage.

B. Store units with adequate bracing and protect units to prevent contact with soil, to prevent staining, and to prevent cracking, distortion, warping or other physical damage.

C. Lift and support units only at designated points shown on Shop Drawings.

1.7 COORDINATION

A. Furnish loose connection hardware and anchorage items to be embedded in or attached to other construction before starting that Work. Provide locations, setting diagrams, templates, instructions, and directions, as required, for installation.

PART 2 - PRODUCTS

2.1 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 deformed.

B. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

C. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.

D. Supports: Suspend reinforcement from back of mold or use bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place according to PCI MNL 116.

2.2 PRESTRESSING TENDONS

A. Strand: ASTM A 416/A 416M, Grade 270 uncoated, 7-wire, low-relaxation strand.

2.3 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type III, gray, unless otherwise indicated.

B. Normal-Weight Aggregates: Except as modified by PCI MNL 116, ASTM C 33, with coarse aggregates complying with Class 5S.

C. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

D. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and to not contain calcium chloride, or more than 0.15 percent chloride ions or other salts by weight of admixture.

2.4 STEEL CONNECTION MATERIALS

A. Carbon-Steel Shapes and Plates: ASTM A 36/A 36M.

B. Carbon-Steel-Headed Studs: ASTM A 108, AISI 1018 through AISI 1020, cold finished, AWS D1.1/D1.1M, Type A or B, with arc shields and with minimum mechanical properties of PCI MNL 116.

C. Carbon-Steel Plate: ASTM A 283/A 283M.

D. Deformed-Steel Wire or Bar Anchors: ASTM A 496 or ASTM A 706/A 706M.

E. Carbon-Steel Bolts and Studs: ASTM A 307, Grade A carbon-steel, hex-head bolts and studs; carbon-steel nuts, ASTM A 563 and flat, unhardened steel washers, ASTM F 844.

F. High-Strength Bolts and Nuts: ASTM A 325 or ASTM A 490, Type 1, heavy hex steel structural bolts; heavy hex carbon-steel nuts, ASTM A 563 and hardened carbon-steel washers, ASTM F 436.

G. Shop-Primed Finish: Prepare surfaces of nongalvanized-steel items, except those surfaces to be embedded in concrete, according to requirements in SSPC-SP 3, and shop apply lead- and chromate-free, rust-inhibitive primer, complying with performance requirements in MPI 79 SSPC-Paint 25 according to SSPC-PA 1.

2.5 BEARING PADS

A. Provide bearing pads for precast structural concrete units as recommended by precast fabricator for application.

2.6 GROUT MATERIALS

A. Sand-Cement Grout: Portland cement, ASTM C 150, Type I, and clean, natural sand, ASTM C 144 or ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

B. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, Grade A for drypack and Grades B and C for flowable grout and of consistency suitable for application within a 30-minute working time.

C. Epoxy-Resin Grout: Two-component, mineral-filled epoxy resin; ASTM C 881/C 881M, of type, grade, and class to suit requirements.

2.7 CONCRETE MIXTURES

A. Prepare design mixtures for each type of precast concrete required.

1. Limit use of fly ash to 25 percent replacement of portland cement by weight and granulated blast-furnace slag to 40 percent of portland cement by weight; metakaolin and silica fume to 10 percent of portland cement by weight.

B. Design mixtures may be prepared by a qualified independent testing agency or by qualified precast plant personnel at precast structural concrete fabricator's option.

C. Limit water-soluble chloride ions to maximum percentage by weight of cement permitted by ACI 318 or PCI MNL 116 when tested according to ASTM C 1218/C 1218M.

D. Normal-Weight Concrete Mixtures: Proportion by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): 5000 psi minimum.
2. Maximum Water-Cementitious Materials Ratio: 0.40.

E. Water Absorption: 6 percent by weight or 14 percent by volume, tested according to PCI MNL 116.

F. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content complying with PCI MNL 116.

G. When included in design mixtures, add other admixtures to concrete mixtures according to manufacturer's written instructions.

H. Concrete Mix Adjustments: Concrete mix design adjustments may be proposed if characteristics of materials, Project conditions, weather, test results, or other circumstances warrant.

2.8 FABRICATION

A. Cast-in Anchors, Inserts, Plates, Angles, and Other Anchorage Hardware: Fabricate anchorage hardware with sufficient anchorage and embedment to comply with design requirements. Accurately position for attachment of loose hardware, and secure in place during precasting operations. Locate anchorage hardware where it does not affect position of main reinforcement or concrete placement.

2.9 FABRICATION TOLERANCES

A. Fabricate precast structural concrete units straight and true to size and shape with exposed edges and corners precise and true so each finished unit complies with PCI MNL 116 product dimension tolerances.

2.10 SOURCE QUALITY CONTROL

A. Testing: Test and inspect precast structural concrete according to PCI MNL 116 requirements.

B. Defective Units: Discard and replace precast structural concrete units that do not comply with requirements, including strength, manufacturing tolerances, and color and texture range. Chipped,

spalled, or cracked units may be repaired, subject to Architect's approval. Architect reserves the right to reject precast units that do not match approved samples, sample panels, and mockups.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install clips, hangers, bearing pads, and other accessories required for connecting precast structural concrete units to supporting members and backup materials.

B. Erect precast structural concrete level, plumb, and square within specified allowable tolerances. Provide temporary structural framing, supports, and bracing as required to maintain position, stability, and alignment of units until permanent connection.

1. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.
2. Remove projecting lifting devices and grout fill voids within recessed lifting devices flush with surface of adjacent precast surfaces when recess is exposed.
3. For hollow-core slab voids used as electrical raceways or mechanical ducts, align voids between units and tape butt joint at end of slabs.

C. Connect precast structural concrete units in position by bolting, welding, grouting, or as otherwise indicated on Shop Drawings. Remove temporary shims, wedges, and spacers as soon as practical after connecting and grouting are completed.

3.2 ERECTION TOLERANCES

A. Erect precast structural concrete units level, plumb, square, true, and in alignment without exceeding the noncumulative erection tolerances of PCI MNL 135.

B. Minimize variations between adjacent slab members by jacking, loading, or other method recommended by fabricator and approved by Architect.

3.3 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:

1. Erection of precast structural concrete members.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

C. Field welds will be visually inspected and nondestructive tested according to ASTM E 165 or ASTM E 709. High-strength bolted connections will be subject to inspections.

D. Prepare test and inspection reports.

END OF SECTION 034100

SECTION 07 1400
FLUID-APPLIED WATERPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fluid applied membrane waterproofing.

1.02 SUBMITTALS

A. Product Data: Provide data for membrane, surface conditioner, flexible flashings, joint cover sheet, and joint and crack sealants.

B. Certificate: Certify that products meet or exceed specified requirements.

C. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and acceptable installation temperatures.

D. Warranty:

1. Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

2. Submit installer's certification that installation complies with all warranty conditions for the waterproof membrane.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacture of fluid-applied waterproofing membranes with five year’s experience.

B. Installer Qualifications: Company specializing in installation of fluid-applied waterproofing with minimum five year’s experience.

1.04 FIELD CONDITIONS

A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application and until cured.

1.05 WARRANTY

A. Contractor shall correct defective Work within a five year period after Date of Substantial Completion; remove and replace materials concealing waterproofing at no cost to Owner.

B. Provide five year manufacturer warranty for waterproofing failing to resist penetration of water, except where such failures are the result of structural failures of building. Hairline cracking of concrete due to temperature change or shrinkage is not considered a structural failure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Polyurethane Waterproofing Manufacturers:

1. Carlisle Coatings & Waterproofing, Inc: www.carlisle-ccw.com.
2. Karnak Corporation: www.karnakcorp.com.
3. BASF Construction Chemicals-Building Systems: www.buildingsystems.basf.com

B. Cold-Applied, Modified-Polymer Elastomeric Waterproofing Manufacturers:

1. Carlisle Coatings & Waterproofing, Inc: www.carlisle-ccw.com.
2. Epro Waterproofing Systems; ECOLINE-R: www.eproserv.com.
3. Henry Company; Henry CM100: www.henry.com.

2.02 MEMBRANE AND FLASHING MATERIALS

A. Polyurethane Waterproofing: Cold-applied one or two component polyurethane, complying with ASTM C836/C836M.

1. Cured Thickness: 60 mils, minimum.
2. VOC Content: None.
3. Tensile Strength: 400 psi, measured in accordance with ASTM D412.
4. Ultimate Elongation: 180 percent, measured in accordance with ASTM D412.
5. Hardness: 30, measured in accordance with ASTM D2240, using Type A durometer.
6. Permeance: 0.073 perms, measured in accordance with ASTM E96/E96M.
7. Adhesion: greater than 150 psi, measured in accordance with ASTM D4541.
8. Brittleness Temperature: -50 F, measured in accordance with ASTM D746.

B. Cold-Applied, Modified-Polymer Elastomeric Waterproofing:

1. Cured Thickness: 55 mils (0.055 inches), minimum.
2. Suitable for installation over concrete substrates.
3. Tensile Strength: 95 psi, measured in accordance with ASTM D2370.
4. Ultimate Elongation: 350 percent, minimum, measured in accordance with ASTM D2370.
5. Hardness: 10, minimum, measured in accordance with ASTM C661, using Type A durometer.
6. Water Vapor Permeability: 0.07 perm inch, maximum measured in accordance with ASTM E96/E96M.

C. Under-Tile Waterproofing and Anti-Fracture Membrane: Specifically designed for bonding to concrete, backer boards, and plywood under ceramic tile; complying with ANSI A118.10.

1. Material: Trowel-applied water-based acrylic membrane, 25 mils thick, minimum, with continuous polyester fabric reinforcement.

D. Flexible Flashings: Type recommended by membrane manufacturer.

E. Joint Cover Sheet: 1 inch thick elastic sheet material designated for and compatible with membrane.

2.03 ACCESSORIES

A. Sealant for Joints and Cracks in Substrate: Type compatible with waterproofing material and as recommended by waterproofing manufacturer.

B. Separation Sheet: Sheet polyethylene, 6 mil thick.

C. Cant Strips: Premolded composition material.

D. Counterflashings: As recommended by membrane and protection board manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify substrate surfaces are free of frozen matter, dampness, loose particles, cracks, pits, projections, penetrations, or foreign matter detrimental to adhesion or application of waterproofing system.

C. Verify that substrate surfaces are smooth, free of honeycomb or pitting, and not detrimental to full contact bond of waterproofing materials.

D. Verify that items that penetrate surfaces to receive waterproofing are securely installed.

3.02 PREPARATION

A. Protect adjacent surfaces not designated to receive waterproofing.

B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions. Vacuum substrate clean.

C. Do not apply waterproofing to surfaces unacceptable to manufacturer.

D. Fill non-moving joints and cracks with a filler compatible with waterproofing materials.

E. Seal moving joints and joints with sealant, not rigid filler, using procedures recommended by sealant and waterproofing manufacturers.

F. Install cant strips at inside corners.

3.03 INSTALLATION

A. Apply waterproofing in accordance with manufacturer's instructions to specified minimum thickness.

B. At joints and cracks less than 1/2 inch in width including joints between horizontal and vertical surfaces, apply 12 inch wide strip of joint cover sheet.

C. Center joint cover sheet over joints. Roll sheet into 1/8 inch coating of waterproofing material. Apply second coat over sheet extending minimum of 6 inches beyond sheet edges.

D. Extend membrane over cants and up intersecting surfaces at membrane perimeter minimum 6 inches above horizontal surface for first ply and 8 inches at subsequent plies laid in shingle fashion.

E. Install flexible flashings and seal into waterproofing material. Seal items penetrating through membrane with flexible flashings.

F. Seal membrane and flashings to adjoining surfaces. Install termination bar at all edges. Install counterflashing over all exposed edges.

3.04 FIELD QUALITY CONTROL

A. On completion of horizontal membrane installation, dam installation area in preparation for flood testing.

B. Flood to minimum depth of 1 inch with clean water. After 48 hours, inspect for leaks.

C. If leaking is found, remove water, repair leaking areas with new waterproofing materials as directed by Architect; repeat flood test. Repair damage to building.

D. When area is proven watertight, drain water and remove dam.

3.05 PROTECTION

A. Do not permit traffic over unprotected or uncovered membrane.

END OF SECTION 071400

SECTION 07 5423
THERMOPLASTIC-POLYOLEFIN ROOFING (TPO)

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Thermoplastic membrane roofing system, including all components specified.

B. Comply with the published recommendations and instructions of the roofing membrane manufacturer, at http://manual.fsbp.com.

C. Commencement of work by Contractor shall constitute acknowledgement by Contractor that this specification can be satisfactorily executed, under the project conditions and with all necessary prerequisites for warranty acceptance by roofing membrane manufacturer. No modification of the Contract Sum will be made for failure to adequately examine the Contract Documents or the project conditions.

1.02 REFERENCE STANDARDS

A. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2014.

B. ASTM C1549 - Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer; 2009 (Reapproved 2014).

C. ASTM D638 - Standard Test Method for Tensile Properties of Plastics; 2010.

D. ASTM D1004 - Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting; 2013.

E. ASTM D6878/D6878M - Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing; 2013.

F. FM DS 1-28 - Wind Design; Factory Mutual System; 2007.

G. FM DS 1-29 - Roof Deck Securement and Above-Deck Roof Components; Factory Mutual System; 2006.

H. PS 1 - Structural Plywood; 2009.

I. PS 20 - American Softwood Lumber Standard; 2010.

J. SPRI ES-1 - Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems; 2011. (ANSI/SPRI/FM 4435/ES-1)

1.03 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference: Before start of roofing work, Contractor shall hold a meeting to discuss the proper installation of materials and requirements to achieve the warranty.

1. Require attendance with all parties directly influencing the quality of roofing work or affected by the performance of roofing work.

2. Notify Architect well in advance of meeting.

1.04 SUBMITTALS

A. Product Data:

1. Provide membrane manufacturer's printed data sufficient to show that all components of roofing system, including insulation and fasteners, comply with the specified requirements and with the membrane manufacturer's requirements and recommendations for the system type specified; include data for each product used in conjunction with roofing membrane.
2. Where UL or FM requirements are specified, provide documentation that shows that the roofing system to be installed is UL-Classified or FM-approved, as applicable; include data itemizing the components of the classified or approved system.
3. Installation Instructions: Provide manufacturer's instructions to installer, marked up to show exactly how all components will be installed; where instructions allow installation options, clearly indicate which option will be used.

B. Samples: Submit samples of each product to be used.

C. Shop Drawings: Provide:

1. The roof membrane manufacturer's standard details customized for this project for all relevant conditions, including flashings, base tie-ins, roof edges, terminations, expansion joints, penetrations, and drains.
2. For tapered insulation, provide project-specific layout and dimensions for each board.

D. Specimen Warranty: Submit prior to starting work.

E. Installer Qualifications: Letter from manufacturer attesting that the roofing installer meets the specified qualifications.

F. Pre-Installation Notice: Copy to show that manufacturer's required Pre Installation Notice (PIN) has been accepted and approved by the manufacturer.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Roofing installer shall have the following:

1. Current approval, license, or authorization as applicator by the manufacturer.
2. Fully staffed office within 100 miles of the job site.
3. At least five years experience in installing specified system.
4. Capability to provide a payment performance bond.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver products in manufacturer's original containers, dry and undamaged, with seals and labels intact and legible.

B. Store materials clear of ground and moisture with weather protective covering.

C. Keep combustible materials away from ignition sources.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer - Roofing System: GAF Everguard TPO 60 Mil

1. Roofing systems manufactured by others are acceptable provided the roofing system is completely equivalent in materials and warranty conditions and the manufacturer meets the following qualifications:
   a. Specializing in manufacturing the roofing system to be provided.

B. Manufacturer of Insulation and Cover Boards: Same manufacturer as roof membrane.

C. Manufacturer of Metal Roof Edging: Same manufacturer as roof membrane.

1. Metal roof edging products by other manufacturers are not acceptable.
2. Field- or shop-fabricated metal roof edgings are not acceptable.

2.02 ROOFING SYSTEM DESCRIPTION

A. Roofing System: Thermoplastic polyolefin (TPO) single-ply membrane.

1. Membrane Attachment: Fully adhered.
2. Comply with applicable local building code requirements.
3. Provide assembly having Underwriters Laboratories, Inc. (UL) Class A Fire Hazard Classification.
4. Provide assembly complying with Factory Mutual Corporation (FM) Roof Assembly Classification, FM DS 1-28 and 1-29, and meeting minimum requirements of FM 1-90 wind uplift rating.

B. Roofing System Components: Listed in order from the top of the roof down:

1. Membrane: Thickness as specified.
2. Base Sheet Over Insulation: Cold adhesive attached.
3. Insulation:

   a. Maximum Board Thickness: 3 inches; use as many layers as necessary; stagger joints in adjacent layers.
   b. Tapered: Slope as indicated; provide minimum R-value at thinnest point; place tapered layer on top.
   c. Crickets: Tapered insulation of same type as specified for top layer; slope as indicated.

4. Base Sheet: Fire-rated coated glass fiber slip sheet, loose-laid.

2.03 MEMBRANE MATERIALS

A. Membrane: Flexible, heat weldable sheet composed of thermoplastic polyolefin polymer and ethylene propylene rubber; complying with ASTM D6878/D6878M, with polyester weft inserted reinforcement and the following additional characteristics:

1. Thickness: 0.060 inch plus/minus 10 percent, with coating thickness over reinforcement of 0.024 inch plus/minus 10 percent.
2. Sheet Width: Provide the widest available sheets to minimize field seaming.
3. Puncture Resistance: 265 lbf, minimum, when tested in accordance FTM 101C Method 2031.
4. Solar Reflectance: 0.79, minimum, when tested in accordance with ASTM C1549.
5. Color: White.

B. Slip Sheet: Coated glass fiber mat; qualified as part of Class A assembly over combustible and non-combustible decks, complying with ASTM D828 tensile testing.

C. Curb and Parapet Flashing: Same material as membrane, with encapsulated edge which eliminates need for seam sealing the flashing-to-roof splice; precut to 18 inches wide.

D. Formable Flashing: Non-reinforced, flexible, heat weldable sheet, composed of thermoplastic polyolefin polymer and ethylene propylene rubber.

1. Thickness: 0.060 inch plus/minus 10 percent.
2. Tensile Strength: 1550 psi, minimum, when tested in accordance with ASTM D638 after heat aging.
3. Elongation at Break: 650 percent, minimum, when tested in accordance with ASTM D638 after heat aging.
4. Tearing Strength: 12 lbf, minimum, when tested in accordance with ASTM D1004 after heat aging.
5. Color: White.
6. Acceptable Product: UltraPly TPO Flashing by Firestone.

E. Tape Flashing: 5-1/2 inch nominal wide TPO membrane laminated to cured rubber polymer seaming tape, overall thickness 0.065 inch nominal; TPO QuickSeam Flashing by Firestone.

F. Pourable Sealer: Two-part polyurethane, two-color for reliable mixing; Pourable Sealer by Firestone.

G. Seam Plates: Steel with barbs and Galvalume coating; corrosion-resistance complying with FM 4470.

H. Termination Bars: Aluminum bars with integral caulk ledge; 1.3 inches wide by 0.10 inch thick; Firestone Termination Bar by Firestone.

I. Cut Edge Sealant: Synthetic rubber-based, for use where membrane reinforcement is exposed; UltraPly TPO Cut Edge Sealant by Firestone.

J. General Purpose Sealant: EPDM-based, one part, white general purpose sealant; UltraPly TPO General Purpose Sealant by Firestone.

K. Molded Flashing Accessories: Unreinforced TPO membrane pre-molded to suit a variety of flashing details, including pipe boots, inside corners, outside corners, etc.; UltraPly TPO Small and Large Pipe Flashing by Firestone.

L. Roof Walkway Pads: Non-reinforced TPO walkway pads, 0.130 inch by 30 inches by 40 feet long with patterned traffic bearing surface; UltraPly TPO Walkway Pads by Firestone.

2.04 ROOF INSULATION AND COVER BOARDS

A. Polyisocyanurate Board Insulation: Closed cell polyisocyanurate foam with black glass reinforced mat laminated to faces, complying with ASTM C1289 Type II Class 1, with the following additional characteristics:

1. Thickness: As indicated elsewhere.
2. Size: 48 inches by 96 inches, nominal.

    a. Exception: Insulation to be attached using adhesive or asphalt may be no larger than 48 inches by 48 inches, nominal.

3. R-value (LTTR):

    a. 1.0 inch Thickness: 6.0, minimum.
    b. 1.25 inch Thickness: 7.5, minimum.
    c. 1.5 inch Thickness: 9.0, minimum.
    d. 1.75 inch Thickness: 10.5, minimum.
    e. 2.0 inch Thickness: 12.1, minimum.
    f. 3.0 inch Thickness: 18.5, minimum.
    g. 4.0 inch Thickness: 25.0, minimum.

4. Compressive Strength: 20 psi when tested in accordance with ASTM C1289.
5. Ozone Depletion Potential: Zero; made without CFC or HCFC blowing agents.
6. Recycled Content: 19 percent post-consumer and 15 percent post-industrial, average.

B. Insulation Fasteners: Type and size as required by roof membrane manufacturer for roofing system and warranty to be provided; use only fasteners furnished by roof membrane manufacturer.

C. Adhesive for Insulation Attachment: Type as required by roof membrane manufacturer for roofing system and warranty to be provided; use only adhesives furnished by roof membrane manufacturer.

2.05 METAL ACCESSORIES

A. Parapet Copings: Formed metal coping with galvanized steel anchor/support cleats for capping any parapet wall; watertight, maintenance free, without exposed fasteners; butt type joints with concealed splice plates; mechanically fastened as indicated; Firestone PTCF.

1. Wind Performance:

a. At least the minimum required when tested in accordance with ANSI/SPRI/FM 4435/ES-1 Test Method RE-3, current edition.
b. Provide product listed in current Factory Mutual Research Corporation Approval Guide with at least FM 1-90 rating.

2. Description: Coping sections allowed to expand and contract freely while locked in place on anchor cleats by mechanical pressure from hardened stainless steel springs factory attached to anchor cleats; 8 inch wide splice plates with factory applied dual non-curing sealant strips capable of providing watertight seal.
3. Dimensions:

a. Wall Width: As indicated on the drawings.
b. Piece Length: Minimum 144 inches.
c. Curved Application: Factory fabricated in true radius.

4. Anchor/Support Cleats: 20 gage, 0.036 inch thick prepunched galvanized cleat with 12 inch wide stainless steel spring mechanically locked to cleat at 72 inches on center.
5. Special Shaped Components: Provide factory-fabricated pieces necessary for complete installation, including miters, corners, intersections, curves, pier caps, and end caps; minimum 14 inch long legs on corner, intersection, and end pieces.
6. Fasteners: Factory-furnished; electrolytically compatible; minimum pull out resistance of 240 pounds for actual substrate used; no exposed fasteners.

2.06 ACCESSORY MATERIALS

A. Wood Nailers: PS 20 dimension lumber, Structural Grade No. 2 or better Southern Pine, Douglas Fir; or PS 1, APA Exterior Grade plywood; pressure preservative treated.

1. Width: 3-1/2 inches, nominal minimum, or as wide as the nailing flange of the roof accessory to be attached to it.
2. Thickness: Same as thickness of roof insulation.

B. Cant Strips and Tapered Edge Strips: 45 degree face slope and minimum 5 inch face dimension; provide at all angle changes between vertical and horizontal planes that exceed 45 degrees.

1. Install using hot asphalt (Type IV), roofing mastic, or mechanically fastened using fasteners and plates approved by roofing manufacturer.

PART 3 INSTALLATION

3.01 GENERAL

A. Install roofing, insulation, flashings, and accessories in accordance with roofing manufacturer's published instructions and recommendations for the specified roofing system. Where manufacturer provides no instructions or recommendations, follow good roofing practices and industry standards. Comply with federal, state, and local regulations.

B. Obtain all relevant instructions and maintain copies at project site for duration of installation period.

C. Do not start work until Pre-Installation Notice has been submitted to manufacturer as notification that this project requires a manufacturer's warranty.

D. Perform work using competent and properly equipped personnel.

E. Temporary closures, which ensure that moisture does not damage any completed section of the new roofing system, are the responsibility of the applicator. Completion of flashings, terminations, and temporary closures shall be completed as required to provide a watertight condition.

F. Install roofing membrane only when surfaces are clean, dry, smooth and free of snow or ice; do not apply roofing membrane during inclement weather or when ambient conditions will not allow proper application; consult manufacturer for recommended procedures during cold weather. Do not work with sealants and adhesives when material temperature is outside the range of 60 to 80 degrees F.

G. Protect adjacent construction, property, vehicles, and persons from damage related to roofing work; repair or restore damage caused by roofing work.

1. Protect from spills and overspray from bitumen, adhesives, sealants and coatings.
2. Particularly protect metal, glass, plastic, and painted surfaces from bitumen, adhesives, and sealants within the range of wind-borne overspray.
3. Protect finished areas of the roofing system from roofing related work traffic and traffic by other trades.

H. Until ready for use, keep materials in their original containers as labeled by the manufacturer.

I. Consult membrane manufacturer's instructions, container labels, and Material Safety Data Sheets (MSDS) for specific safety instructions. Keep all adhesives, sealants, primers and cleaning materials away from all sources of ignition.

3.02 EXAMINATION

A. Examine roof deck to determine that it is sufficiently rigid to support installers and their mechanical equipment and that deflection will not strain or rupture roof components or deform deck.

B. Verify that surfaces and site conditions are ready to receive work. Correct defects in the substrate before commencing with roofing work.

C. Examine roof substrate to verify that it is properly sloped to drains.

D. Verify that the specifications and drawing details are workable and not in conflict with the roofing manufacturer's recommendations and instructions; start of work constitutes acceptable of project conditions and requirements.

3.03 PREPARATION

A. Take appropriate measures to ensure that fumes from adhesive solvents are not drawn into the building through air intakes.

B. Prior to proceeding, prepare roof surface so that it is clean, dry, and smooth, and free of sharp edges, fins, roughened surfaces, loose or foreign materials, oil, grease and other materials that may damage the membrane.

C. Fill all surface voids in the immediate substrate that are greater than 1/4 inch wide with fill material acceptable insulation to membrane manufacturer.

D. Seal, grout, or tape deck joints, where needed, to prevent bitumen seepage into building.

3.04 VAPOR RETARDER

A. Before installing insulation install vapor retarder directly over the deck.

B. Ensure that all penetrations and edge conditions are sealed to prevent moisture and air drive into the roofing system.

3.05 INSULATION AND COVER BOARD INSTALLATION

A. Install insulation in configuration and with attachment method(s) specified in PART 2, under Roofing System.

B. Install insulation in a manner that will not compromise the vapor retarder integrity.

C. Install only as much insulation as can be covered with the completed roofing system before the end of the day's work or before the onset of inclement weather.

D. Lay roof insulation in courses parallel to roof edges.

E. Neatly and tightly fit insulation to all penetrations, projections, and nailers, with gaps not greater than 1/4 inch. Fill gaps greater than 1/4 inch with acceptable insulation. Do not leave the roofing membrane unsupported over a space greater than 1/4 inch.

F. Mechanical Fastening: Using specified fasteners and insulation plates engage fasteners through insulation into deck to depth and in pattern required by Factory Mutual for FM Class specified in PART 2 and membrane manufacturer, whichever is more stringent.

3.06 SINGLE-PLY MEMBRANE INSTALLATION

A. Beginning at low point of roof, place membrane without stretching over substrate and allow to relax at least 30 minutes before attachment or splicing; in colder weather allow for longer relax time.

B. Lay out the membrane pieces so that field and flashing splices are installed to shed water.

C. Install membrane without wrinkles and without gaps or fishmouths in seams; bond and test seams and laps in accordance with membrane manufacturer's instructions and details.

D. Install membrane adhered to the substrate, with edge securement as specified.

E. Adhered Membrane: Bond membrane sheet to substrate using membrane manufacturer's recommended bonding material, application rate, and procedures.

F. Edge Securement: Secure membrane at all locations where membrane terminates or goes through an angle change greater than 2 in 12 inches using mechanically fastened reinforced perimeter fastening strips, plates, or metal edging as indicated or as recommended by roofing manufacturer.

1. Exceptions: Round pipe penetrations less than 18 inches in diameter and square penetrations less than 4 inches square.
2. Metal edging is not merely decorative; ensure anchorage of membrane as intended by roofing manufacturer.

3.07 FLASHING AND ACCESSORIES INSTALLATION

A. Install flashings, including laps, splices, joints, bonding, adhesion, and attachment, as required by membrane manufacturer's recommendations and details.

B. Metal Accessories: Install metal edgings, gravel stops, and copings in locations indicated on the drawings, with horizontal leg of edge member over membrane and flashing over metal onto membrane.

1. Follow roofing manufacturer's instructions.
2. Remove protective plastic surface film immediately before installation.
3. Install water block sealant under the membrane anchorage leg.
4. Flash with manufacturer's recommended flashing sheet unless otherwise indicated.
5. Where single application of flashing will not completely cover the metal flange, install additional piece of flashing to cover the metal edge.
6. If the roof edge includes a gravel stop and sealant is not applied between the laps in the metal edging, install an additional piece of self-adhesive flashing membrane over the metal lap to the top of the gravel stop; apply seam edge treatment at the intersections of the two flashing sections.
7. When the roof slope is greater than 1:12, apply seam edge treatment along the back edge of the flashing.

C. Scuppers: Set in sealant and secure to structure; flash as recommended by manufacturer.

D. Roofing Expansion Joints: Install as shown on drawings and as recommended by roofing manufacturer.

E. Flashing at Walls, Curbs, and Other Vertical and Sloped Surfaces: Install weathertight flashing at all walls, curbs, parapets, curbs, skylights, and other vertical and sloped surfaces that the roofing membrane abuts to; extend flashing at least 8 inches high above membrane surface.

1. Use the longest practical flashing pieces.

2. Evaluate the substrate and overlay and adjust installation procedure in accordance with membrane manufacturer's recommendations.
3. Complete the splice between flashing and the main roof sheet with specified splice adhesive before adhering flashing to the vertical surface.
4. Provide termination directly to the vertical substrate as shown on roof drawings.

F. Roof Drains:

1. Taper insulation around drain to provide smooth transition from roof surface to drain. Use specified pre-manufactured tapered insulation with facer or suitable bonding surface to achieve slope; slope not to exceed manufacturer's recommendations.
2. Position membrane, then cut a hole for roof drain to allow 1/2 to 3/4 inch of membrane to extend inside clamping ring past drain bolts.
3. Make round holes in membrane to align with clamping bolts; do not cut membrane back to bolt holes.
4. Apply sealant on top of drain bowl where clamping ring seats below the membrane
5. Install roof drain clamping ring and clamping bolts; tighten clamping bolts to achieve constant compression.

G. Flashing at Penetrations: Flash all penetrations passing through the membrane; make flashing seals directly to the penetration.

1. Pipes, Round Supports, and Similar Items: Flash with specified pre-molded pipe flashings wherever practical; otherwise use specified self-curing elastomeric flashing.
2. Pipe Clusters and Unusual Shaped Penetrations: Provide penetration pocket at least 2 inches deep, with at least 1 inch clearance from penetration, sloped to shed water.

3.08 FINISHING AND WALKWAY INSTALLATION

A. Install walkways at access points to the roof, around rooftop equipment that may require maintenance, and where indicated on the drawings.

B. Walkway Pads: Adhere to the roofing membrane, spacing each pad at minimum of 1.0 inch and maximum of 3.0 inches from each other to allow for drainage.

1. If installation of walkway pads over field fabricated splices or within 6 inches of a splice edge cannot be avoided, adhere another layer of flashing over the splice and extending beyond the walkway pad a minimum of 6 inches on either side.
2. Prime the membrane, remove the release paper on the pad, press in place, and walk on pad to ensure proper adhesion.

3.09 FIELD QUALITY CONTROL

A. Inspection by Manufacturer: Provide final inspection of the roofing system by a Technical Representative employed by roofing system manufacturer specifically to inspect installation for warranty purposes (i.e. not a sales person).

B. Perform all corrections necessary for issuance of warranty.

3.10 CLEANING

A. Clean all contaminants generated by roofing work from building and surrounding areas, including bitumen, adhesives, sealants, and coatings.

B. Repair or replace building components and finished surfaces damaged or defaced due to the work of this section; comply with recommendations of manufacturers of components and surfaces.

C. Remove leftover materials, trash, debris, equipment from project site and surrounding areas.

3.11 PROTECTION

A. Where construction traffic must continue over finished roof membrane, provide durable protection and replace or repair damaged roofing to original condition.

END OF SECTION 075423

SECTION 07 9200

JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nonsag gunnable joint sealants.

B. Joint backings and accessories.

1.02 REFERENCE STANDARDS

A. ASTM C794 - Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants; 2015.

B. ASTM C834 - Standard Specification for Latex Sealants; 2010.

C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.

D. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems; 2000 (Reapproved 2011).

E. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.

F. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2008 (Reapproved 2012).

G. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov.

1.03 SUBMITTALS

A. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.

1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
2. List of backing materials approved for use with the specific product.
3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
4. Substrates the product should not be used on.

B. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.

C. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

D. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.

SECTION 07 9200

JOINT SEALANTS

1.04 QUALITY ASSURANCE

A. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.

1. Adhesion Testing: In accordance with ASTM C794.
2. Compatibility Testing: In accordance with ASTM C1087.
3. Allow sufficient time for testing to avoid delaying the work.
4. Deliver to manufacturer sufficient samples for testing.
5. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.
6. Testing is not required if sealant manufacturer provides data showing previous testing, not older than 24 months, that shows satisfactory adhesion, lack of staining, and compatibility.

1.05 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective work within a five year period after Date of Substantial Completion.

C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Nonsag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.

1. BASF Construction Chemicals-Building Systems: www.buildingsystems.basf.com.
2. Dow Corning Corporation: www.dowcorning.com/construction.
3. Hilti, Inc: www.us.hilti.com.
4. Pecora Corporation: www.pecora.com.
5. Tremco Global Sealants: www.tremcosealants.com.
6. Sherwin-Williams Company: www.sherwin-williams.com.

2.02 JOINT SEALANT APPLICATIONS

A. Scope:

1. Exterior Joints: Seal open joints, whether or not the joint is indicated on the drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.

a. Wall expansion and control joints.
b. Joints between door, window, and other frames and adjacent construction.
c. Joints between different exposed materials.
d. Openings below ledge angles in masonry.
e. Other joints indicated below.

2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.

    a. Joints between door, window, and other frames and adjacent construction.
    b. Other joints indicated below.

3. Do not seal the following types of joints.

    a. Intentional weepholes in masonry.
    b. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
    c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
    d. Joints where installation of sealant is specified in another section.
    e. Joints between suspended panel ceilings/grid and walls.

B. Exterior Joints: Use nonsag non-staining silicone sealant, unless otherwise indicated.

C. Interior Joints: Use nonsag polyurethane sealant, unless otherwise indicated.

1. Wall and Ceiling Joints in Non-Wet Areas: Acrylic emulsion latex sealant.
2. Wall and Ceiling Joints in Wet Areas: Nonsag polyurethane sealant for continuous liquid immersion.
3. Floor Joints in Wet Areas: Nonsag polyurethane "nontraffic-grade" sealant suitable for continuous liquid immersion.
4. Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white.

D. Interior Wet Areas: Bathrooms, restrooms, kitchens, food service areas, and food processing areas; fixtures in wet areas include plumbing fixtures, food service equipment, countertops, cabinets, and other similar items.

2.03 JOINT SEALANTS - GENERAL

A. Sealants and Primers: Provide products having lower volatile organic compound (VOC) content than indicated in South Coast Air Quality Management District (SCAQMD); Rule 1168.

2.04 NONSAG JOINT SEALANTS

A. Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.

1. Movement Capability: Plus and minus 50 percent, minimum.
2. Non-Staining To Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.
3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.

B. Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.

1. Color: White.

C. Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multicomponent; not expected to withstand continuous water immersion or traffic.

1. Movement Capability: Plus and minus 25 percent, minimum.

D. Type ___ - Polyurethane Sealant for Continuous Water Immersion: ASTM C920, Grade NS, Uses M and A; single or multicomponent; explicitly approved by manufacturer for continuous water immersion; suitable for traffic exposure when recessed below traffic surface.

1. Movement Capability: Plus and minus 35 percent, minimum.

E. Type ___ - Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.

2.05 ACCESSORIES

A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.

B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

C. Verify that backer rods are of the correct size.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.03 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Install bond breaker backing tape where backer rod cannot be used.

D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

E. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

F. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

3.04 FIELD QUALITY CONTROL

A. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.

B. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

3.05 POST-OCCUPANCY

A. Post-Occupancy Inspection: Perform visual inspection of entire length of project sealant joints at a time that joints have opened to their greatest width; i.e. at the low temperature in the thermal cycle. Report failures immediately and repair.

END OF SECTION 079200

SECTION 08 1113
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-fire-rated hollow metal doors and frames.

B. Fire-rated hollow metal doors and frames.

C. Thermally insulated hollow metal doors with frames.

D. Hurricane resistant hollow metal doors and frames.

1.02 RELATED REQUIREMENTS

A. Section 08 7100 - Door Hardware.

1.03 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

B. ANSI/SDI A250.3 - Test Procedure and Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors and Frames; 2007 (R2011).

C. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.

D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2014.

E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.

F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

G. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength, Low Alloy, and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2015.

H. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2014.

I. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.

J. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2014 (ANSI/BHMA A156.115).

K. FBC TAS 201 - (Florida Building Code) Impact Test Procedures; Testing Application Standard; 1994.

L. FBC TAS 202 - (Florida Building Code) Criteria for Testing Impact and Non-Impact Resistant Building Envelope Components Using Uniform Static Air Pressure; Testing Application Standard; 1994.

M. FBC TAS 203 - (Florida Building Code) Criteria for Testing Products Subject To Cyclic Wind Pressure Loading; Testing Application Standard; 1994.

N. FLA (PAD) - Florida Building Code Online - Product Approval Directory; database at www.floridabuilding.org.

O. ICC A117.1 - Accessible and Usable Buildings and Facilities; International Code Council; 2009 (ANSI).

P. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.

Q. Miami (APD) - Approved Products Directory; Miami-Dade County; database at www.miamidade.gov/development/product-control.asp.

R. NAAMM HMMA 805 - Recommended Selection and Usage Guide for Hollow Metal Doors and Frames; 2012.

S. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.

T. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.

U. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; 2007.

V. NAAMM HMMA 850 - Fire-Protection and Smoke Control Rated Hollow Metal Door and Frame Products; 2014.

W. NAAMM HMMA 860 - Guide Specifications for Hollow Metal Doors and Frames; 2013.

X. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2013.

Y. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2012.

Z. UL (BMD) - Building Materials Directory; current edition.

AA. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.

B. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.

B. Copies of Documents at Project Site: Maintain at the project site a copy of each referenced document that prescribes installation requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Hollow Metal Doors and Frames:

1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com.
2. Republic Doors: www.republicdoor.com.
3. Steelcraft, an Allegion brand: www.allegion.com/us.

2.02 DESIGN CRITERIA

A. Requirements for Hollow Metal Doors and Frames:

1. Steel used for fabrication of doors and frames shall comply with one or more of the following requirements; Galvannealed steel conforming to ASTM A653/A653M, cold-rolled steel conforming to ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel conforming to ASTM A1011/A1011M, Commercial Steel (CS) Type B for each.
2. Accessibility: Comply with ICC A117.1 and ADA Standards.
3. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.
4. Door Edge Profile: Manufacturers standard for application indicated.
5. Typical Door Face Sheets: Flush.
6. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
7. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvannealed) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.

a. Based on NAAMM HMMA Custom Guidelines: Provide at least A25/ZF75 (galvannealed) for interior applications, and at least A60/ZF180 (galvannealed) or G60/Z180 (galvanized) for corrosive locations.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 HOLLOW METAL DOORS

A. Door Finish: Factory primed and field finished.

B. Type ___, Exterior Doors: Thermally insulated.

1. Based on NAAMM HMMA Custom Guidelines:
   a. Comply with guidelines of NAAMM HMMA 860 for Hollow Metal Doors and Frames.
   b. Performance Level 2 - Moderate Duty, in accordance with NAAMM HMMA 805.
   c. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
   d. Door Face Metal Thickness: 18 gage, 0.042 inch, minimum.

2. Core Material: Manufacturers standard core material/construction and in compliance with requirements.
3. Door Thickness: 1-3/4 inch, nominal.

C. Type ___, Interior Doors, Non-Fire Rated:

1. Based on NAAMM HMMA Custom Guidelines:

   a. Comply with guidelines of NAAMM HMMA 860 for Hollow Metal Doors and Frames.
   b. Performance Level 2 - Moderate Duty, in accordance with NAAMM HMMA 805.
   c. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
   d. Door Face Metal Thickness: 18 gage, 0.042 inch, minimum.

2. Core Material: Manufacturers standard core material/construction and in compliance with requirements.
3. Door Thickness: 1-3/4 inch, nominal.

D. Type ___, Fire-Rated Doors:

1. Based on NAAMM HMMA Custom Guidelines: Comply with NAAMM HMMA 850 requirements for fire-rated doors.

   a. Comply with guidelines of NAAMM HMMA 860 for Hollow Metal Doors and Frames.

b. Performance Level 2 - Moderate Duty, in accordance with NAAMM HMMA 805.
c. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
d. Door Face Metal Thickness: 18 gage, 0.042 inch, minimum.

2. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
3. Temperature-Rise Rating (TRR) Across Door Thickness: In accordance with local building code and authorities having jurisdiction (AHJ).
4. Provide units listed and labeled by UL (Underwriters Laboratories) - UL (BMD) or WH (Warnock Hersey) - ITS (DIR).

   a. Attach fire rating label to each fire rated unit.

5. Door Thickness: 1-3/4 inch, nominal.

E. Type ___, Hurricane Resistant Doors:

1. Comply with Florida Building Code (FBC) test protocols for High Velocity Hurricane Zone (HVHZ) FBC TAS 201, FBC TAS 202 and FBC TAS 203.
2. Design and size door and frame components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M.

   a. Design Wind Loads: Comply with requirements of authorities having jurisdiction (AHJ).
   b. Wind-Borne Debris Resistance: Door and frame components shall have FLA (PAD) approval or Miami (APD) approval for Large and Small Missile impact and pressure cycling at design wind loads.

3. Based on NAAMM HMMA Custom Guidelines:

   a. Comply with guidelines of NAAMM HMMA 860 for Hollow Metal Doors and Frames.
   b. Performance Level 2 - Moderate Duty, in accordance with NAAMM HMMA 805.
   c. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
   d. Door Face Metal Thickness: 16 gage, 0.053 inch, minimum.

4. Core Material: Manufacturers standard core material/construction and in compliance with requirements.
5. Door Thickness: 1-3/4 inch, nominal.

2.04 HOLLOW METAL FRAMES

A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.

B. Frame Finish: Factory primed and field finished.

C. Exterior Door Frames: Knock-down type.

1. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
2. Weatherstripping: Separate, see Section 08 7100.

D. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.

1. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.

E. Door Frames, Fire-Rated: Knock-down type.

1. Fire Rating: Same as door, labeled.
2. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.

F. Hurricane Resistant Door Frames: With same hurricane resistance as door; face welded or full profile/continuously welded construction, ground smooth, fully prepared and reinforced for hardware installation.

1. Frame Metal Thickness: 14 gage, 0.067 inch, minimum.

G. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.

H. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inch high to fill opening without cutting masonry units.

2.05 ACCESSORIES

A. Grout for Frames: Portland cement grout with maximum 4 inch slump for hand troweling; thinner pumpable grout is prohibited.

B. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.

C. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

2.06 FINISHES

A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

B. Factory Finish: Complying with ANSI/SDI A250.3, manufacturer's standard coating.

C. Bituminous Coating: Asphalt emulsion or other high-build, water-resistant, resilient coating.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 PREPARATION

A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.03 INSTALLATION

A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.

B. Install fire rated units in accordance with NFPA 80.

C. Coordinate frame anchor placement with wall construction.

D. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.

E. Coordinate installation of hardware.

F. Coordinate installation of electrical connections to electrical hardware items.

G. Touch up damaged factory finishes.

3.04 TOLERANCES

A. Clearances Between Door and Frame: Comply with related requirements of specified door and frame standards or custom guidelines indicated.

B. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.

3.05 ADJUSTING

A. Adjust for smooth and balanced door movement.

3.06 SCHEDULE

A. Refer to Door and Frame Schedule on the drawings.

END OF SECTION 081113

SECTION 08 7100
DOOR HARDWARE

SECTION 08 7100 - DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hardware for wood, aluminum, and hollow metal doors.

B. Hardware for fire-rated doors.

C. Lock cylinders for doors that hardware is specified in other sections.

D. Thresholds.

E. Weatherstripping, seals and door gaskets.

1.02 REFERENCE STANDARDS

A. BHMA A156.2 - American National Standard for Bored and Preassembled Locks & Latches; Builders Hardware Manufacturers Association; 2011 (ANSI/BHMA A156.2).

B. BHMA A156.3 - American National Standard for Exit Devices; Builders Hardware Manufacturers Association; 2014 (ANSI/BHMA A156.3).

C. BHMA A156.4 - American National Standard for Door Controls - Closers; Builders Hardware Manufacturers Association, Inc.; 2013 (ANSI/BHMA A156.4).

D. BHMA A156.6 - American National Standard for Architectural Door Trim; Builders Hardware Manufacturers Association; 2010 (ANSI/BHMA A156.6).

E. BHMA A156.8 - American National Standard for Door Controls - Overhead Stops and Holders; Builders Hardware Manufacturers Association, Inc.; 2010 (ANSI/BHMA A156.8).

F. BHMA A156.13 - American National Standard for Mortise Locks & Latches Series 1000; Builders Hardware Manufacturers Association; 2012 (ANSI/BHMA A156.13).

G. BHMA A156.18 - American National Standard for Materials and Finishes; Builders Hardware Manufacturers Association, Inc.; 2012 (ANSI/BHMA A156.18).

H. BHMA A156.21 - American National Standard for Thresholds; Builders Hardware Manufacturers Association; 2014 (ANSI/BHMA A156.21).

I. BHMA A156.22 - American National Standard for Door Gasketing and Edge Seal Systems, Builders Hardware Manufacturers Association; 2012 (ANSI/BHMA A156.22).

J. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2013.

K. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

SECTION 08 7100
DOOR HARDWARE

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the manufacture, fabrication, and installation of products that door hardware will be installed upon.

B. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.

C. Convey Owner's keying requirements to manufacturers.

D. Preinstallation Meeting: Convene a preinstallation meeting one week prior to commencing work of this section; require attendance by all affected installers.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project.

C. Hardware Schedule: Detailed listing of each item of hardware to be installed on each door. Use door numbering scheme as included in the Contract Documents. Identify electrically operated items and include power requirements.

D. Keying Schedule: Submit for approval of Owner.

E. Samples: Prior to preparation of hardware schedule:

1. Submit one (1) sample of hinge, latchset, lockset, and closer illustrating style, color, and finish.

F. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.

G. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.

H. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.

I. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

J. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.

K. Maintenance Materials and Tools: Furnish the following for Owner's use in maintenance of project.

1. See Section 01 6000 - Product Requirements, for additional provisions.
2. Extra Lock Cylinders: Ten for each master keyed group.

3. Tools: One set of all special wrenches or tools applicable to each different or special hardware component, whether supplied by the hardware component manufacturer or not.

1.05 QUALITY ASSURANCE

A. Standards for Fire-Rated Doors: Maintain one copy of each referenced standard on site, for use by Architect and Contractor.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years of documented experience.

C. Hardware Supplier Qualifications: Company specializing in supplying commercial door hardware with five years of experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

1.07 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide five year warranty for door closers and _____.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Best Access Systems, division of Stanley Security Solutions: www.bestaccess.com.

B. Hager Companies: www.hagerco.com.

2.02 MANUFACTURERS - BASIS OF DESIGN

2.03 DOOR HARDWARE - GENERAL

A. Provide hardware specified or required to make doors fully functional, compliant with applicable codes, and secure to the extent indicated.

B. Provide items of a single type of the same model by the same manufacturer.

C. Provide products that comply with the following:

1. Applicable provisions of federal, state, and local codes.
2. Fire-Rated Doors: NFPA 80.
3. Hardware on Fire-Rated Doors, Except Hinges: Listed and classified by UL as suitable for the purpose specified and indicated.

4. Hardware for Smoke and Draft Control Doors (Indicated as "S" on Drawings): Provide hardware that enables door assembly to comply with air leakage requirements of the applicable code.

D. Finishes: Provide door hardware of the same finish unless otherwise indicated.

1. Primary Finish: Satin chrome plated over nickel on brass or bronze, 626 (approx US26D).
2. Secondary Finish: Satin chrome plated over nickel on brass or bronze, 626 (approx US26D).

    a. Use secondary finish in kitchens, bathrooms, and other spaces containing chrome or stainless steel finished appliances, fittings, and equipment; provide primary finish on one side of door and secondary finish on other side if necessary.

3. Finish Definitions: BHMA A156.18.
4. Exceptions:

    a. Where base metal is specified to be different, provide finish that is an appearance equivalent according to BHMA A156.18.
    b. Hinges for Fire-Rated Doors: Steel base metal with painted finish.
    c. Door Closer Covers and Arms: Color to be selected by Architect from manufacturer's standard colors.
    d. Aluminum Surface Trim and Gasket Housings: Anodized to match door, not to match other hardware.
    e. Hardware for Aluminum Storefront Doors: Finished to match door, except hand contact surfaces to be satin stainless steel.

E. Fasteners:

1. Concrete and Masonry Substrates: Stainless steel machine screws and lead expansion shields.

2.04 LOCKS AND LATCHES

A. Locks: Provide a lock for every door, unless specifically indicated as not requiring locking.

1. If no hardware set is indicated for a swinging door provide an office lockset.
2. Trim: Provide lever handle or pull trim on outside of all locks unless specifically stated to have no outside trim.
3. Lock Cylinders: Provide key access on outside of all locks unless specifically stated to have no locking or no outside trim.
4. In door sections, where a lock cylinder referenced to this Section is specified, furnish and install a mortise lock cylinder keyed to the building keying system.

B. Lock Cylinders: Manufacturer’s standard tumbler type, six-pin standard core.

1. Provide cams and/or tailpieces as required for locking devices required.

C. Keying: Grand master keyed.

1. Include construction keying.
2. Supply keys in the following quantities:

    a. ____ master keys.
    b. ____ grand master keys.
    c. ____ construction keys.
    d. ____ change keys for each lock.

D. Latches: Provide a latch for every door that is not required to lock, unless specifically indicated "push/pull" or "not required to latch".

2.05 HINGES

A. Hinges: Provide hinges on every swinging door.

1. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
2. Provide ball-bearing hinges at all doors having closers.
3. Provide hinges in the quantities indicated.
4. Provide non-removable pins on exterior outswinging doors.
5. Provide non-removable pins on outswinging interior doors at unit entrances.

B. Quantity of Hinges Per Door:

1. Doors From 60 inches High up to 90 inches High: Three hinges.
2. Doors 90 inches High up to 120 inches High: Four hinges.

2.06 PUSH/PULLS

A. Push/Pulls: Comply with BHMA A156.6.

1. Provide push and pull on doors not specified to have lockset, latchset, exit device, or auxiliary lock.
2. On solid doors, provide matching push plate and pull plate on opposite faces.
3. On glazed storefront doors, provide matching push/pull bars on both faces.

2.07 CYLINDRICAL LOCKSETS

A. Locking Functions: As defined in BHMA A156.2, and as follows.

1. Passage: No locking, always free entry and exit.
2. Privacy: F76, emergency tool unlocks.
3. Office: F82 Grade 1, key not required to lock, unlocks upon exit.
4. Classroom: F84, key required to lock.

2.08 MORTISE LOCKSETS

A. Locking Functions: As defined in BHMA A156.13, and as follows:

1. Passage: F01.
2. Office: F04, key not required to lock, remains locked upon exit.

3. Entry, Deadbolt: F20, may be locked without key, free egress.
4. Store Door: F14, deadbolt locked by key from both sides, not an emergency exit (must be unlocked during occupied hours).

2.09 FLUSHBOLTS AND COORDINATORS

A. Flushbolts: Lever extension bolts in leading edge of door, one bolt into floor, one bolt into top of frame.

1. Pairs of Swing Doors: At inactive leaves, provide flush bolts of type as required to comply with code.
2. Floor Bolts: Provide dustproof strike except at metal thresholds.

2.10 EXIT DEVICES

A. Locking Functions: Functions as defined in BHMA A156.3, and as follows:

1. Entry/Exit, Always-Locked: Key outside retracts latchbolt but does not unlock lever, no latch holdback.
2. Exit Only, Secure: No outside trim, no key entry, no latch holdback, deadlocking latchbolt.

2.11 CLOSERS

A. Closers: Complying with BHMA A156.4.

1. Provide surface-mounted, door-mounted closers unless otherwise indicated.
2. Provide a door closer on every exterior door.
3. Provide a door closer on every fire- and smoke-rated door. Spring hinges are not an acceptable self-closing device unless specifically so indicated.
4. On pairs of swinging doors, if an overlapping astragal is present, provide coordinator to ensure the leaves close in proper order.

2.12 STOPS AND HOLDERS

A. Stops: Complying with BHMA A156.8; provide a stop for every swinging door, unless otherwise indicated.

1. Provide wall stops, unless otherwise indicated.
2. If wall stops are not practical, due to configuration of room or furnishings, provide overhead stop.
3. Stop is not required if positive stop feature is specified for door closer; positive stop feature of door closer is not an acceptable substitute for a stop unless specifically so stated.

2.13 GASKETING AND THRESHOLDS

A. Gaskets: Complying with BHMA A156.22.

1. On each door in smoke partition, provide smoke gaskets; top, sides, and meeting stile of pairs. If fire/smoke partitions are not indicated on drawings, provide smoke gaskets on each door identified as a "smoke door" and 20-minute rated fire doors.
2. On each exterior door, provide weatherstripping gaskets, unless otherwise indicated; top, sides, and meeting stiles of pairs.
   a. Where exterior door is also required to have fire or smoke rating, provide gaskets functioning as both smoke and weather seals.

3. On each exterior door, provide door bottom sweep, unless otherwise indicated.

B. Thresholds: Complying with BHMA A156.21.

1. At each exterior door, provide a threshold unless otherwise indicated.

C. Fasteners At Exterior Locations: Non-corroding.

2.14 SLIDING AND BIFOLDING DOOR HARDWARE

A. Bifolding Door Hardware: Track, hanger fasteners, guides, and pulls; size track and hangers according to manufacturer's recommendations for weight of doors.

B. Pocket Doors: Provide pocket door kit, including header assembly, split studs, hangers, door hanger plates, bumper, guides, floor plate, and end bracket.

1. Provide flush cup pull on both sides.
2. Provide edge pull in leading edge.

2.15 PROTECTION PLATES AND ARCHITECTURAL TRIM

A. Protection Plates:

1. Kickplate: Provide on push side of every door with closer, except aluminum storefront and glass entry doors.

B. Drip Guard: Provide projecting drip guard over all exterior doors unless they are under a projecting roof or canopy.

2.16 KEY CONTROLS

A. Key Management System: For each keyed lock on project, provide one set of consecutively numbered duplicate key tags with hanging hole and snap catch.

1. Security Key Tags: For each keyed lock on project, provide one set of matching key tags for permanent attachment to one key of each set.

B. Facility Manager's Key Cabinet: Sheet steel construction, piano hinged door with key lock.

1. Mounting: Wall-mounted.
2. Capacity: Actual quantity of keys, plus 25 percent additional capacity.
3. Size key hooks to hold 6 keys each.

4. Finish: Baked enamel, manufacturer's standard color.
5. Key cabinet lock to building keying system.

2.17 FIRE DEPARTMENT LOCK BOX

A. Fire Department Lock Box: Heavy-duty, surface mounted, solid stainless-steel box with hinged door and interior gasket seal; single drill resistant lock with dust covers and tamper alarm.

1. Capacity: Holds 10 keys.
2. Finish: Manufacturer's standard dark bronze.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that doors and frames are ready to receive work; labeled, fire-rated doors and frames are present and properly installed, and dimensions are as indicated on shop drawings.

3.02 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions and applicable codes.

B. Use templates provided by hardware item manufacturer.

C. Install hardware on fire-rated doors and frames in accordance with code and NFPA 80.

D. Mounting heights for hardware from finished floor to center line of hardware item.

E. Set exterior door thresholds with full-width bead of elastomeric sealant on each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.

3.03 FIELD QUALITY CONTROL

A. Provide an Architectural Hardware Consultant to inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.

3.04 ADJUSTING

A. Adjust work under provisions of Section 01 7000.

B. Adjust hardware for smooth operation.

C. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

3.05 CLEANING

A. Clean adjacent surfaces soiled by hardware installation. Clean finished hardware per manufacturer's instructions after final adjustments has been made. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

3.06 PROTECTION

A. Protect finished Work under provisions of Section 01 7000.

B. Do not permit adjacent work to damage hardware or finish.

HARDWARE SETS

END OF SECTION 087100

SECTION 09 2236.23

METAL LATH

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal lath for Portland cement and gypsum plaster.

B. Furring for metal lath.

C. Metal ceiling framing.

1.02 REFERENCE STANDARDS

A. ASTM C841 - Standard Specification for Installation of Interior Lathing and Furring; 2003 (Reapproved 2013).

B. ASTM C847 - Standard Specification for Metal Lath; 2014a.

C. ASTM C1063 - Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster; 2015a.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on furring and lathing components, structural characteristics, material limitations, and finish.

1.04 QUALITY ASSURANCE

A. Maintain one copy of each installation standard referenced in PART 3 on site throughout the duration of lathing and plastering work.

B. Installer Qualifications: Company specializing in performing the work of this section a minimum five years documented experience.

PART 2 PRODUCTS

2.01 FRAMING AND LATH ASSEMBLIES

A. Provide completed assemblies with the following characteristics:

1. Maximum Deflection of Vertical Assemblies: 1:360 under lateral point load of 100 lbs.
2. Maximum Deflection of Horizontal Assemblies: 1:240 deflection under dead loads and wind uplift.

B. Fire Rated Assemblies: Provide components complying with requirements for fire rated assemblies specified in the section where the plaster finish is specified.

SECTION 09 2236.23

METAL LATH

2.02 FRAMING MATERIALS

A. Furring Channels: Formed steel, minimum 0.020 inch thick, 3/8 inch deep by 7/8 inch high, splicing permitted; galvanized.

B. Main Ceiling Channels: Formed steel, asphalt coated, minimum 0.05 inch thick, 3/4 inch deep by 1-1/2 inch high, single piece, no splicing; galvanized.

C. Hangers: Steel wire, of size and type to suit application, to support ceiling components in place to deflection limits as indicated.

D. Ceiling Hangers: Rolled steel sections, of size and type to suit application, to rigidly support ceiling components in place to deflection limits as indicated; galvanized.

E. Lateral Bracing: Formed steel, minimum 0.060 inch thick, size and length as required; galvanized.

2.03 LATH

A. Flat Rib Metal Lath: ASTM C847, galvanized; 1/8 inch thick.

1. Weight: To suit application, comply with deflection criteria, and as specified in ASTM C841 for framing spacing.

B. Corner Mesh: Formed sheet steel, minimum 0.018 inch thick, perforated flanges shaped to permit complete embedding in plaster, minimum 2 inch size; same finish as lath.

C. Strip Mesh: Expanded metal lath, same weight as lath, 2 inch wide by 24 inch long; same finish as lath.

D. Beads, Screeds, Joint Accessories, and Other Trim: Depth governed by plaster thickness, maximum possible lengths.

1. Material: PVC, open grid flanges or perforated with nailing holes.
2. Casing Beads: Square edges.
3. Corner Beads: Radiused corners.
4. Base Screeds: Bevelled edges.
5. Expansion Joints: Accordion profile with factory-installed protective tape, 2 inch wide flanges.
6. Control Joints: Accordion profile with protective tape, 2 inch flanges.

2.04 ACCESSORIES

A. Anchorage: Tie wire, nails, and other metal supports, of type and size to suit application; to rigidly secure materials in place, galvanized.

B. Fasteners: Self-piercing tapping screws; ASTM C1002.

C. Polyethylene Sheet: Clear, 6 mil thick.

D. Tie Wire: Annealed galvanized steel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that substrates are ready to receive work and conditions are suitable for application.

C. Do not begin until unacceptable conditions have been corrected.

D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 INSTALLATION - GENERAL

A. Install interior lath and furring in accordance with ASTM C841.

3.03 WALL FURRING

A. Install furring channels horizontally; secure with fasteners on alternate channel flanges at maximum 24 inches on center.

B. Space furring channels maximum 16 inches on center, and not more than 4 inches away from floor and ceiling lines.

3.04 CEILING AND SOFFIT FRAMING

A. Install furring after work above ceiling or soffit is complete. Coordinate the location of hangers with other work.

B. Install furring independent of walls, columns, and above-ceiling work.

C. Securely anchor hangers to structural members or embed in structural slab. Space hangers as required to limit deflection to criteria indicated. Use rigid hangers at exterior soffits.

D. Space main carrying channels at maximum 72 inch on center, and not more than 6 inches from wall surfaces. Lap splice securely.

E. Securely fix carrying channels to hangers to prevent turning or twisting and to transmit full load to hangers.

F. Place furring channels perpendicular to carrying channels, not more than 2 inches from perimeter walls, and rigidly secure. Lap splices securely.

G. Reinforce openings in suspension system that interrupt main carrying channels or furring channels with lateral channel bracing. Extend bracing minimum 24 inches past each opening.

H. Laterally brace suspension system.

3.05 CONTROL AND EXPANSION JOINTS

A. Locate joints as indicated on drawings.

B. Construct control joints of back-to-back casing beads set 1/4 inch apart. Set both beads over 6 inch wide strip of polyethylene sheet.

3.06 LATH INSTALLATION

A. Apply metal lath taut, with long dimension perpendicular to supports.

B. Lap ends minimum 1 inch. Secure end laps with tie wire where they occur between supports.

C. Continuously reinforce internal angles with corner mesh, except where the metal lath returns 3 inches from corner to form the angle reinforcement; fasten at perimeter edges only.

D. Place corner bead at external wall corners; fasten at outer edges of lath only.

E. Place base screeds at termination of plaster areas; secure rigidly in place.

F. Place 4 inch wide strips of metal lath centered over junctions of dissimilar backing materials. Secure rigidly in place.

G. Place lath vertically above each top corner and each side of door frames to 6 inches above ceiling line.

H. Place casing beads at terminations of plaster finish. Butt and align ends. Secure rigidly in place.

I. Place additional strip mesh diagonally at corners of lathed openings. Secure rigidly in place.

3.07 TOLERANCES

A. Maximum Variation from True Lines and Levels: 1/8 inch in 10 feet.

B. Maximum Variation from True Position: 1/8 inch.

END OF SECTION 092236

SECTION 09 2400

PORTLAND CEMENT PLASTERING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Portland cement plaster for installation over metal lath, masonry, concrete, and solid surfaces.

1.02 RELATED REQUIREMENTS

A. Section 09 2236.23 - Metal Lath: Metal furring and lathing for plaster.

1.03 REFERENCE STANDARDS

A. ASTM C91/C91M - Standard Specification for Masonry Cement; 2012.

B. ASTM C150/C150M - Standard Specification for Portland Cement; 2012.

C. ASTM C206 - Standard Specification for Finishing Hydrated Lime; 2014.

D. ASTM C926 - Standard Specification for Application of Portland Cement-Based Plaster; 2015b.

E. PCA EB049 - Portland Cement Plaster/Stucco Manual; Portland Cement Association; 2003.

F. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittals procedures.

B. Product Data: Provide data on plaster materials, characteristics and limitations of products specified.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the work of this section with minimum Five years documented experience.

1.06 FIELD CONDITIONS

A. Do not apply plaster when substrate or ambient air temperature is under 50 degrees F or over 80 degrees F.

PART 2 PRODUCTS

2.01 PORTLAND CEMENT PLASTER ASSEMBLIES

A. Exterior Stucco: Portland cement plaster system, made of finish, brown, and scratch coat and reinforcing mesh.

1. Provide continuous exterior insulation as part of the system, by the same manufacturer.

2. Provide weather resistive barrier and air barrier as part of the system, by the same manufacturer.

B. Fire Rated Assemblies: Provide completed assemblies with the following characteristics:

1. Coordinate components of fire rated assemblies with materials specified for support of plaster in other sections.
2. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL Fire Resistance Directory.

2.02 PLASTER MATERIALS

A. Portland Cement, Aggregates, and Other Materials: In accordance with ASTM C926.

B. Portland Cement: ASTM C150, Type I.

1. For finish coat: White color.

C. Masonry Cement: ASTM C91 Type N.

D. Lime: ASTM C206, Type S.

E. Water: Clean, fresh, potable and free of mineral or organic matter that could adversely affect plaster.

2.03 METAL LATH

A. Metal Lath and Accessories: As specified in Section 09 2236.23. Use metal lath as plaster base at all framed wall locations.

B. Beads, Screeds, and Joint Accessories: As specified in Section 09 2236.23.

2.04 PLASTER MIXES

A. Over Solid Bases: Three-coat application, mixed and proportioned in accordance with manufacturer's instructions.

B. Over Metal Lath: Three-coat application, mixed and proportioned in accordance with manufacturer's instructions.

C. Premixed Plaster Materials: Mix in accordance with manufacturer's instructions.

D. First Coat:

1. One part Portland cement.
2. Minimum 1 and maximum 2 parts masonry cement.
3. Minimum 2-1/2 and maximum 4 parts aggregate, per sum of cementitious materials.

E. Second Coat: Same as first coat, except minimum 3 parts and maximum 5 parts aggregate.

F. Finish Coat:

1. One part Portland cement.
2. One part masonry cement.
3. 3 parts sand, per sum of cementitious materials.

G. Mix only as much plaster as can be used prior to initial set.

H. Add color pigments to finish coat in accordance with manufacturer's instructions.

I. Mix materials dry, to uniform color and consistency, before adding water.

J. Protect mixtures from freezing, frost, contamination, and excessive evaporation.

K. Do not retemper mixes after initial set has occurred.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify the suitability of existing conditions before starting work.

B. Masonry: Verify joints are cut flush and surface is ready to receive work of this section. Verify no bituminous or water repellent coatings exist on masonry surface.

C. Concrete: Verify surfaces are flat, honeycomb are filled flush, and surfaces are ready to receive work of this section. Verify no bituminous, water repellent, or form release agents exist on concrete surface that are detrimental to plaster bond.

D. Metal Lath and Accessories: Verify lath is flat, secured to substrate, and joint and surface perimeter accessories are in place.

E. Mechanical and Electrical: Verify services within walls have been tested and approved.

3.02 PREPARATION

A. Dampen masonry surfaces to reduce excessive suction.

B. Clean concrete surfaces of foreign matter. Clean surfaces using acid solutions, solvents, or detergents. Wash surfaces with clean water.

C. Roughen smooth concrete surfaces and apply bonding agent in accordance with manufacturer's instructions.

3.03 PLASTERING

A. Apply premixed plaster in accordance with manufacturer's instructions.

B. Apply plaster in accordance with ASTM C926.

C. Three-Coat Application Over Metal Lath:

1. Apply first coat to a nominal thickness of 3/8 inch.

2. Apply second coat to a nominal thickness of 3/8 inch.
3. Apply finish coat to a nominal thickness of 1/8 inch.

D. Three-Coat Application Over Solid Bases:

1. Apply first coat to a nominal thickness of 1/4 inch.
2. Apply second coat to a nominal thickness of 1/4 inch.
3. Apply finish coat to a nominal thickness of 1/8 inch.

E. In exterior work, scribe contraction joints through entire plaster application at 10 feet on center each way.

F. Moist cure base coats.

G. Apply second coat immediately following initial set of first coat.

H. After curing, dampen previous coat prior to applying finish coat.

I. Finish Texture: Float to a consistent and smooth finish.

J. Avoid excessive working of surface. Delay troweling as long as possible to avoid drawing excess fines to surface.

K. Moist cure finish coat for minimum period of 48 hours.

3.04 TOLERANCES

A. Maximum Variation from True Flatness: 1/8 inch in 10 feet.

END OF SECTION 092400

SECTION 09 9113

EXTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints, stains, and varnishes.

C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:

1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
2. Exposed surfaces of steel lintels and ledge angles.

D. Do Not Paint or Finish the Following Items:

1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
2. Items indicated to receive other finishes.
3. Items indicated to remain unfinished.
4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
5. Non-metallic roofing and flashing.
6. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, zinc, and lead.
7. Marble, granite, slate, and other natural stones.
8. Floors, unless specifically indicated.
9. Ceramic and other types of tiles.
10. Brick, glass unit masonry, architectural concrete, cast stone, integrally colored plaster and stucco.
11. Glass.
12. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

1.03 REFERENCE STANDARDS

A. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2007.

B. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; current edition, www.paintinfo.com.

C. SSPC-SP 1 - Solvent Cleaning; 2015.

D. SSPC-SP 6 - Commercial Blast Cleaning; Society for Protective Coatings; 2007.

E. SSPC-SP 13 - Surface Preparation of Concrete; Society for Protective Coatings; 2003 (Reaffirmed 2015).

SECTION 09 9113

EXTERIOR PAINTING

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:

1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
2. MPI product number (e.g. MPI #47).
3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.

C. Certification: By manufacturer that paints and finishes comply with VOC limits specified.

D. Manufacturer's Instructions: Indicate special surface preparation procedures.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 01 6000 - Product Requirements, for additional provisions.
2. Extra Paint and Finish Materials: 1 gallon of each color; from the same product run, store where directed.
3. Label each container with color in addition to the manufacturer's label.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum five years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years’ experience and approved by manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.07 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply exterior paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

D. Minimum Application Temperatures for Latex Paints: 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.

B. Paints:

1. Benjamin Moore & Co: www.benjaminmoore.com.
2. Sherwin-Williams Company: www.sherwin-williams.com.

2.02 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready mixed, unless required to be a field-catalyzed paint.

1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
2. Supply each paint material in quantity required to complete entire project's work from a single production run.
3. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Volatile Organic Compound (VOC) Content: Comply with Section 01 6116.

C. Flammability: Comply with applicable code for surface burning characteristics.

D. Colors: To be selected from manufacturer's full range of available colors.

1. Selection to be made by Architect after award of contract.
2. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to Owner.

2.03 PAINT SYSTEMS - EXTERIOR

A. Paint E-OP - Exterior Surfaces to be Painted, Unless Otherwise Indicated: Including concrete, concrete masonry units, brick, fiber cement siding, primed wood, and primed metal.

1. Two top coats and one coat primer.
2. Top Coat(s): Exterior Latex.
3. Top Coat Sheen:
   a. Satin: MPI gloss level 4; use this sheen at all locations.

4. Primer: As recommended by top coat manufacturer for specific substrate.

B. Paint E-TR-C - Transparent Finish on Concrete Floors:

1. 1 coat stain.
2. Sealer: Water Based for Concrete Floors.
3. Sealer Sheen:

a. Satin: MPI gloss level 4; use this sheen at all locations.

2.04 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

C. Test shop-applied primer for compatibility with subsequent cover materials.

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:

1. Exterior Plaster and Stucco: 12 percent.
2. Fiber Cement Siding: 12 percent.
3. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
4. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.
5. Concrete Floors and Traffic Surfaces: 8 percent.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

F. Concrete:

1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
2. Clean surfaces with pressurized water. Use pressure range of 1500 to 4000 psi at 6 to 12 inches. Allow to dry.
3. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.

G. Masonry:

1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
2. Prepare surface as recommended by top coat manufacturer.

H. Fiber Cement Siding: Remove dirt, dust and other foreign matter with a stiff fiber brush. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.

I. Exterior Gypsum Board: Fill minor defects with exterior filler compound. Spot prime defects after repair.

J. Exterior Plaster: Fill hairline cracks, small holes, and imperfections with exterior patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

K. Asphalt, Creosote, or Bituminous Surfaces: Remove foreign particles to permit adhesion of finishing materials. Apply latex based sealer or primer.

L. Concrete Floors and Traffic Surfaces: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.

M. Aluminum: Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.

N. Galvanized Surfaces:

1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.

O. Ferrous Metal:

1. Solvent clean according to SSPC-SP1.
2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
3. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.

P. Exterior Wood Surfaces to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied. Back prime concealed surfaces before installation.

Q. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Exterior Wood to Receive Opaque Finish: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 4 weeks.

C. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

E. Apply each coat to uniform appearance.

F. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply additional coats until complete hide is achieved.

G. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

H. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection.

3.05 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.06 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION 099113

SECTION 22 0500

COMMON WORK RESULTS FOR PLUMBING

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. This Section includes the following:

1. Piping materials and installation instructions common to most piping systems.
2. Transition fittings.
3. Dielectric fittings.
4. Sleeves.
5. Grout.
6. Equipment installation requirements common to equipment sections.
7. Painting and finishing.
8. Concrete bases.
9. Supports and anchorages.

1.03 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

F. The following are industry abbreviations for plastic materials:

1. CPVC: Chlorinated polyvinyl chloride plastic.
2. PE: Polyethylene plastic.
3. PVC: Polyvinyl chloride plastic.

SECTION 22 0500

COMMON WORK RESULTS FOR PLUMBING

1.04 RELATED DOCUMENTS

A. Contaminated Groundwater and Soil Management Plan

Prior to any and all construction activities, the contractor is responsible for verifying if location of construction activities are subject to environmental land use controls (LUC). Any and all encountered contaminated soil and or groundwater shall be handled per the “soil and ground water management plan”, dated February 13, 2015 included in the project manual. Contractor shall verify that LUC construction permit has been filed and approved for this work.

SUBMITTALS

B. Product Data: For the following:

1. Transition fittings.
2. Dielectric fittings.
3. Escutcheons.

1.05 QUALITY ASSURANCE

A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."

1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

B. Electrical Characteristics for Plumbing Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.07 COORDINATION

A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for plumbing installations.

B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

C. Coordinate requirements for access panels and doors for plumbing items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Panels."

PART 2 - PRODUCTS

2.01 PIPE, TUBE, AND FITTINGS

A. Refer to individual Division 22 piping Sections for pipe, tube, and fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.02 JOINING MATERIALS

A. Refer to individual Division 22 piping Sections for special joining materials not listed below.

B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.

a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.

2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.

C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

E. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.

F. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

G. Solvent Cements for Joining Plastic Piping:

1. CPVC Piping: ASTM F 493.
2. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.

2.03 TRANSITION FITTINGS

A. AWWA Transition Couplings: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.

1. Underground Piping NPS 2 and Larger: AWWA C219, metal sleeve-type coupling.

B. Flexible Transition Couplings for Underground Nonpressure Drainage Piping: ASTM C 1173 with elastomeric sleeve, ends same size as piping to be joined, and corrosion-resistant metal band on each end.

2.04 DIELECTRIC FITTINGS

A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.

B. Insulating Material: Suitable for system fluid, pressure, and temperature.

C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.

D. Dielectric-Flange Kits: Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.

1. Separate companion flanges and steel bolts and nuts shall have 150- or 300-psig minimum working pressure where required to suit system pressures.

E. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.

2.05 SLEEVES

A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.

C. Molded PVC: Permanent, with nailing flange for attaching to wooden forms.

D. PVC Pipe: ASTM D 1785, Schedule 40.

E. Molded PE: Reusable, PE, tapered-cup shaped, and smooth-outer surface with nailing flange for attaching to wooden forms.

2.06 GROUT

A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.

1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000-psi, 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

SECTION 22 0500

COMMON WORK RESULTS FOR PLUMBING

3.01 PIPING SYSTEMS - COMMON REQUIREMENTS

A. Install piping according to the following requirements and Division 22 Sections specifying piping systems.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping to permit valve servicing. .

E. Install piping at indicated slopes.

F. Install piping free of sags and bends.

G. Install fittings for changes in direction and branch connections.

H. Select system components with pressure rating equal to or greater than system operating pressure.

I. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.

J. Verify final equipment locations for roughing-in.

K. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.02 PIPING JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements and Division 22 Sections specifying piping systems.

B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.

F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.

H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
2. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
3. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
4. PVC Nonpressure Piping: Join according to ASTM D 2855.

3.03 PIPING CONNECTIONS

A. Make connections according to the following, unless otherwise indicated:

1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.04 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

B. Install plumbing equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

C. Install equipment to allow right of way for piping installed at required slope.

3.05 PAINTING

A. Painting of plumbing systems, equipment, and components is specified in Division 09 Section " Painting and Coating"

B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.06 CONCRETE BASES

A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.

1. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.
2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.
3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
5. Install anchor bolts to elevations required for proper attachment to supported equipment.
6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
7. As specified in Division 03 Section.

3.07 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A. Refer to Division 05 Section "Metal Fabrications" for structural steel.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing materials and equipment.

C. Field Welding: Comply with AWS D1.1.

3.08 GROUTING

A. Mix and install grout for plumbing equipment base bearing surfaces, pump and other equipment base plates, and anchors.

B. Clean surfaces that will come into contact with grout.

C. Provide forms as required for placement of grout.

D. Avoid air entrapment during placement of grout.

E. Place grout, completely filling equipment bases.

F. Place grout on concrete bases and provide smooth bearing surface for equipment.

G. Place grout around anchors.

H. Cure placed grout.

END OF SECTION

SECTION 224900
PREFABRICATED MODULAR BATHROOM

PART 1 - GENERAL

1.1 SCOPE

A. This specification covers the construction and placing of the Santiago precast concrete flush toilet building as produced by CXT, PUBLIC BATHROOM COMPANY OR EQUAL Incorporated.

2.0 SPECIFICATIONS

ASTM C33	Concrete Aggregates
ASTM C39	Method of Test for Compressive Strength of Cylindrical Concrete Specimens
ASTM C143	Method of Test for Slump of Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C192	Method of Making and Curing Test Specimens in the Laboratory
ACI 1211.1	Recommended Practice for Selecting Proportions for Normal and Heavyweight Concrete
PCI MNL 116	Quality Control for Plants and Production of Precast Pre-stressed Concrete Products

3.0 MANUFACTURER CRITERIA

The manufacturer supplying the requested precast concrete multi-flush facility must meet the following:

A. Manufacturer must be ISO 9001 certified at the time of bid.

B. Manufacturing plant must be PCI certified at the time of bid.

C. Manufacturer must not have defaulted on any contract within the last five years.

D. Manufacturer must provide stamped, engineered drawings prior to acceptance.

E. Manufacturer must show four examples of precast concrete flush facilities produced, installed, and in use as an example of their ability to perform on this contract.

Manufacturers meeting these criteria are:

CXT, PUBLIC BATHROOM COMPANY OR EQUAL
Spokane Industrial Park
3808 North Sullivan Road, Building 7
Spokane, WA 99216
Phone: 800-696-5766

PUBLIC BATHROOM COMPANY OR EQUAL
2586 Business Parkway
Minden NV, 89423
(888) 888-2060, extension 9

4.0 DESIGN CRITERIA

SECTION 224900
PREFABRICATED MODULAR BATHROOM

The final design has been designed to meet the following criteria. Calculations and Engineer's stamped drawings are available upon request by the customer and are for their sole and specific use only. The design criteria are to ensure that the Santiago not only will withstand the forces of nature listed below but will provide protection from vandalism and other unforeseen hazards.

B. Wind Load

1. The final design will withstand the effects of 180 mile per hour wind load or applicable Florida Building Code

D. Additional Design Standards

1. The final designed to meet the requirements of the Americans with Disabilities Act Requirements and Uniform Federal Accessibility Standards as of the date of this specification.

2. The final design is either all concrete structure or pending the specific company, a composite of concrete and metal construction as long as it meets the design intent.

5.0 MATERIALS

A. Concrete - General

The concrete mix design will be designed to ACI 211.1 to produce concrete of good workability.

1. Concrete will contain a minimum of 610 pounds of cement per cubic yard. Cement will be a low alkali type I or III conforming to ASTM C-150.
2. Coarse aggregates used in the concrete mix design will conform to ASTM C33 with the designated size of coarse aggregate #67.
3. Minimum water/cement ratio will not exceed .45. Slump to be between 3" – 4". Slump may be increased using chemical admixtures provided that the concrete maintains same or lower water to cement ratio and odes not exhibit segregation. Slump will never exceed 9".
4. Air-entraining admixtures will conform to ASTM C260. Water reducing admixtures will conform to ASTM C494, Type A.

B. Colored Concrete

1. Color additives will conform to ASTM C979. A 12"x12"x1" color sample will be available for customer approval.
2. The following will contain colored concrete:
   a. Toilet building roof panels
   b. Building walls
   c. Screen panels
3. The same brand and type of color additive will be used throughout the manufacturing process.
4. All ingredients will be weighed and the mixing operation will be adequate to ensure uniform dispersion of the color.

D. Hot Weather Concrete

The temperature of the concrete will not exceed 95 degrees F. at the time of placement. When the ambient reaches 90 degrees F. the concrete will be protected with moist covering.

E. Concrete Reinforcement

1. All reinforcing steel will conform to ASTM A615. All welded wire fabric will conform to ASTM A185.
2. All reinforcement will be new, free of dirt, oil, paint, grease, loose mill scale and loose or thick rust when placed.
3. Details not shown of drawings or specified will be to ACI318.
4. Steel reinforcement will be centered in the cross-sectional area of the walls and will have at least 1" of cover on the under surface of the floor and roof.
5. The maximum allowable variation for center-center spacing of reinforcing steel will be ½".
6. Full lengths of reinforcing steel will be used when possible. When splices are necessary on long runs, splices will be alternated from opposite sides of the components for adjacent steel bars. Lap bars #4 or smaller a minimum of 12". Lap bars larger than #4 a minimum of 24 bar diameters.
7. Reinforcing bars will be bent cold. No bars partially embedded in concrete will be field bent unless approved by the customer.

F. Sealers and Curing Compounds

1. Curing compounds, if used, will be colorless, complying with ASTM C309, type I or 1-D.
2. Weatherproofing sealer for exterior of building will be a clear water repellent penetrating sealer.

G. Caulking, Grout, Adhesive and Sealer

1. Caulking service temperatures from -40 to +194 degrees Fahrenheit.
2. Interior and exterior joints will be caulked with a paintable polyurethane sealant.
3. Gout will be a non-shrink type and will be painted to match the color of surrounding concrete as nearly as possible.
4. Cement based coating is formulated with a very fine aggregate system and a built in bonding agent.

H. Paint

1. All paints and materials will conform to all Federal specifications or be similar "top-of-the-line-components". Paints will not contain more than .06 percent by weight of lead.

2. Type of paints for toilets
   a. Inside concrete surfaces

I Interior floors will be a 2-component, catalyzed, water borne polyamide epoxy with a micronized polymer additive to provide uniform slip resistant texture. The color will be gray.

II Interior walls and ceilings will be a modified acrylic, water repellent penetrating stain followed by one coat of clear sealer. The color will be white followed by a clear acrylic anti-graffiti sealer.

III. Metal surfaces both inside and out DTM ALKYD

b. Exterior concrete surfaces

I Exterior slab will be clear sealer

II Exterior walls and roof will be a water repellent penetrating stain in the same color as the walls or roof followed by a clear acrylic anti-graffiti sealer.

I. Grab bars

Grab bars will be 18 gauge, type 304 stainless steel with 1-1/2" clearance. Grab bars will each be able to withstand 300 pound top loading.

J. Toilet Paper Dispenser

Dispenser will be constructed of ¼" thick, type 304 stainless steel. Dispenser will be capable of holding two (2) standard rolls of toilet paper. Toilet paper holder fastening system will be able to withstand 300 pound top loading.

K. Steel Doors

1. Doors will be a flush panel type 1-3/4" thick, minimum 16 gauge galvanized steel, top painted with ATM ALKYD,

2. Door frames will be knockdown or welded type, single rabbet, minimum 16 gauge galvanized steel top pained with DTM ALKYD, width to suit wall thickness. Three (3) rubber door silencers will be provided on latch side of frame.

L. Door Hinges

Door hinges will be 3 per door with dull chrome plating 4-1/2"x4-1/2", adjustable tension, automatic-closing for each door.

M. Lockset

1. Lockset will meet ANSI A156.2 Series 4000, Grade 1 cylindrical lockset for exterior door.
a) Lever handle both inside and out.
b) U.S. 26D finish.

N. Optional Dead Bolt

Deadbolt will be a Lori Lock standard model with a double cylinder, 2 ¾ " backset, and US26D finish. The cylinder will be a standard 1 1/8" Schlage Mortise cylinder with compression ring and 626 finish.

O. Mirror

Mirror to be 18" x 36" stainless steel.

P. Door Stop

Doorstop will be a dome style stop meeting ANSI 156.16.

Q. Double Coat Hook

Coat hook will be 304 stainless steel 16 gauge (1.5mm), formed construction with a satin finish and have 3/16"x 7/8" nail in anchor. Upper hook will extend at least 2-1/2" inches from the wall. Lower hook will extend at least 1-1/4" from the wall.

R. Door Sweep

Door sweep will be provided at the bottom of door and will be an adjustable brush type.

S. Wall Vent

Wall vent to be crank operated allowing the unit to be opened or closed. Crank will be removable. Wall vent frame will be cast into the concrete wall. The units' frame will be C3 x 4.1 channel steel. The louver frame and louvers will be 18 gauge zinc coated steel with baked enamel finish. Vent to come with insect screen.

T. Windows

1. Windows will be constructed from steel.
2. Window glazing will be ¼" thick translucent pebble finished polycarbonate.

U. Plumbing

1. Waste and vent material will be ABS or PVC plastic and will be plumbed to meet Uniform Building Codes.
2. Water material will be copper tubing Type L, hard drawn. A gate valve will be provided at the inlet end of the water line. All water lines will be of a size to provide proper flushing action based on a nominal water pressure of 40 psi.
3. All plumbing will be concealed in the service area.
4. Hose bib available in the chase area.
5. A main shut-off valve and drain will be provided with plumbing.
6. Toilet will be constructed of vitreous china, wall hung, with siphon jet action. Toilet will have a back spud for a concealed flush valve connection and will be mounted with the top of the seat 18 inches above the finished floor. Seat will be heavy duty solid plastic with an open front. Optional stainless steel available (see submittal).
7. Flush valve will be concealed closet flush-o-meter constructed of rough brass. Furnish valve with integral vacuum breaker and wall mounted push button. Valve will be of a water saver type with a flow of 1.6 gallons per flush.
8. Lavatory will be cast iron with back splashguard, front overflow opening, equipped with brass trap and drain pipe without stopper. Sink will be 20 inches wide x 18 inches front to back x 6 inches deep.
9. Water valve will be self-closing water set with indexed push button.
10. Urinals will be constructed of vitreous china, wall hung with siphon jet action. Urinal will have a back spud for a concealed flush valve connection and will be mounted with the lip no higher than 17 inches above the finished floor.
11. Option for hot water heater.

V. Electrical

1. All electrical wiring will be in conduit, surface mounted in the service area and concealed in the user compartments. All wire will be copper.
2. A 150-amp breaker panel will be provided on building exterior.
3. The chase area will have a 2 each 4-foot 3 bulb low temperature ballast fluorescent light fixtures, for chase and restroom lighting. The lighting will be time clock activated with a switch override
4. Exterior Lighting will be three 35-watt High Pressure Sodium vandal resistant lights operated by a photocell.
5. 1 GFI outlets located next to each sink.
6. 2 restroom exhaust fans with 270 CFM speed controlled (control in chase area) operated by a time clock.
7. The hand dryer will be an air compression type with remote motor unit. Push button switch located in cast nozzle housing with flexible hose connecting blower motor, housing and nozzle. Power input 120VAC, 7A (non-heated air).

W. Stalls

Stall partition walls to be produced of 3-inch concrete. Stall doors to be HDPE, in matching white color.

6.0 MANUFACTURE

A. Mixing and Delivery of Concrete

Mixing and delivery of concrete will be in accordance with ASTM C94, section 10.6 through 10.9 with the following additions:

1. Aggregate and water will be adjusted to compensate for differences in the saturated surface-dry condition.
2. Concrete will be discharged as soon as possible after mixing is complete. This time will not exceed 30 minutes.

B. Placing and Consolidating Concrete

Concrete will be consolidated by the use of mechanical vibrators.
Vibration will be sufficient to accomplish compaction but not to the point that segregation occurs.

C. Finishing Concrete

1. Interior floor and exterior slabs will be floated and troweled. A light broom finish will be applied to the exterior slabs.
2. All exterior building walls and exterior screen walls will be a barnwood texture (optional textures available).
3. All exterior surfaces of the roof panels will be cast to simulate a cedar shake roof. The underside of the overhang will have a smooth finish (optional roof textures available).

D. Cracks and Patching

1. Cracks in concrete components which are judged to affect the

structural integrity of the building will be rejected.
2. Small holes, depressions and air voids will be patched with a suitable material. The patch will match the finish and texture of the surrounding surface.
3. Patching will not be allowed on defective areas if the structural integrity of the building is affected.

E. Curing and Hardening Concrete

1. Concrete surfaces will not be allowed to dry out from exposure to hot, dry weather during initial curing period.

7.0 FINISHING AND FABRICATION

A. Structural Joints

1. Wall components will be joined together with two welded plate pairs at each joint. Each weld plate will be 6" long and located one pair in the top quarter and one pair in the bottom quarter of the seam. Weld plates will be anchored into the concrete panel and welded together with a continuous weld. The inside seams will be a paintable caulk. The outside seams will use a caulk in a coordinating building color or clear.
2. Walls and roof will be joined with weld plates, 3"x 6", at each building corner.
3. The joint between the floor slab and walls will be joined with a grout mixture on the inside, a matching colored caulk on the outside and two weld plates 6" long per wall.

B. Painting/Staining

1. An appropriate curing time will be allowed before paint is applied to concrete.
2. Some applications may require acid etching. A 30% solution of hydrochloric acid will be used, flushed with water and allowed to thoroughly air dry.
3. Painting will not be done outside in cold, frosty or damp weather.
4. Painting will not be done outside in winter unless the temperature is 50 degrees F. or higher.
5. Painting will not be done in dusty areas.

6. Schedule of finishes
   a. Inside concrete surfaces

I Inside floors will be 1 coat of 1-part water based epoxy with a silica sand suspension to provide uniform texture.

II Interior walls and ceilings will be 2 coats of a modified acrylic, water repellent penetrating stain, followed by 1 coat of clear sealer.

b. Metal surfaces both inside and out
   I 2 coats of DTM ALKYD

c. Exterior concrete surfaces
   I Exterior slab will be 1 coat of clear sealer
   II Exterior walls will be 2 coats of water repellent penetrating stain in the same color as the walls or roof followed by 1 coat

of clear acrylic anti-graffiti sealer.

8.0 TESTING

A. The following tests will be performed on concrete used in the manufacture of toilets. All testing will be performed in the CXT, PUBLIC BATHROOM COMPANY OR EQUAL (PCI certified) laboratories. Testing will only be performed by qualified individuals who have been certified ACI Technician Grade 1. Sampling will be in accordance with ASTM C172.

1. The slump of the concrete will be performed on the first batch of concrete in accordance with ASTM C143. This slump will be in the 3"- 4" range. Slump may be increased using chemical admixtures provided that the concrete maintains same or lower water to cement ratio and does not exhibit segregation. Slump will never exceed 9".
2. The air content of the concrete will be checked per ASTM C231 on the first batch of concrete. The air content will be in the range of 5.5% +/- 1%.
3. The compressive strength of the cylinders will be tested to ASTM C39. We will make one (1) cylinder for release, one (1) for 7 days and one (1) for 28 days. The release must be a minimum strength of 2500 psi, the 7 day must be a minimum of 4500 psi and the 28 day must be a minimum of 5000 psi.
4. A copy of all test reports will be available to the customer as soon as 28 day test results are available.

9.0 INSTALLATION

A. Scope of Work

Work specified under this Section relates to the placement of the unit by CXT, PUBLIC BATHROOM COMPANY OR EQUAL on customer prepared foundations.

B. Location

It's the responsibility of the customer to:

1. Provide exact location by stakes or other approved method.
2. Provide clear and level site free of overhead and/or underground obstructions.
3. Provide access to the site for truck delivery and sufficient area for the crane to install and the equipment to perform the contract requirements.
4. Water, electrical, and sewage site connections to be placed per CXT, PUBLIC BATHROOM COMPANY OR EQUAL drawings. Must be placed to easily connect to the building

C. Base

The building shall be set and attached to structural foundation, refer to structural construction documents.

10.0 WARRANTY—PRECAST DIVISION

CXT, PUBLIC BATHROOM COMPANY OR EQUAL warrants that all goods sold pursuant hereto will, when delivered, conform to specifications set forth above. Goods shall be deemed accepted and meeting

specifications unless notice identifying the nature of any non-conformity is provided to CXT, PUBLIC BATHROOM COMPANY OR EQUAL in writing within one (1) year of delivery. CXT, PUBLIC BATHROOM COMPANY OR EQUAL , at its option, will repair or replace the goods or issue credit for the customer provided CXT, PUBLIC BATHROOM COMPANY OR EQUAL is first given the opportunity to inspect such goods. It is specifically understood that CXT, PUBLIC BATHROOM COMPANY OR EQUAL 's obligation hereunder is for credit, repair or replacement only, F.O.B. CXT, PUBLIC BATHROOM COMPANY OR EQUAL 's manufacturing plant, and does not include shipping, handling, installation or other incidental or consequential costs unless otherwise agreed to in writing by CXT, PUBLIC BATHROOM COMPANY OR EQUAL .

This warranty shall not apply to:

1. Any goods which have been repaired or altered without CXT, PUBLIC BATHROOM COMPANY OR EQUAL 's express written consent, in such a way as in the reasonable judgement of CXT, PUBLIC BATHROOM COMPANY OR EQUAL , to adversely affect the stability or reliability thereof;
2. To any goods which have been subject to misuse, negligence, acts of God or accidents or
3. To any goods which have not been installed to manufacturer's specifications and guidelines, improperly maintained, or used outside of the specifications for which such goods were designed.

11.0 DISCLAIMER OF OTHER WARRANTIES

The warranty set forth above is in lieu of all other warranties, express or implied. All other warranties are hereby disclaimed. CXT, PUBLIC BATHROOM COMPANY OR EQUAL makes no other warranty, express or implied, including, without limitation, no warranty of merchantability of fitness for a particular purpose or use.

12.0 LIMITATION OF REMEDIES

In the event of any breach of any obligation hereunder, breach of any warranty regarding the goods or any negligent act or omission or any party, the parties shall otherwise have all rights and remedies available at law; however, IN NO EVENT SHALL CXT, PUBLIC BATHROOM COMPANY OR EQUAL BE SUBJECT TO OR LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.

SECTION 26 001
BASIC ELECTRICAL GENERAL REQUIREMENTS

PART 1 GENERAL

1.01 This section is supported by the requirements of all other Contract Documents.

1.02 SUMMARY

A. This Section governs general procedures and work applicable to Divisions 21, 22, 23, 26, 27 and 28 and to certain equipment and work in Divisions 1, 2, 3, 7, 9 & 10.

1. Furnish labor, supervision, energy, materials, tools, transportation, equipment, permits (if required), insurance, taxes, temporary protection and correction necessary to provide work shown and specified.
2. Provide apparatus, appliances, material or work not shown on drawings but mentioned in specifications, or vice versa, and any incidental accessories necessary to make work complete and ready for operation or inspection by inspecting authorities, even if not specified, without additional expense to Owner.
3. Include minor details not usually shown or specified, but necessary for proper installation and operation, the same as if specified. In cases where apparatus is referred to in singular numbers, it is intended that such reference include as many such items as are required to complete work.
4. Provide conduit, wiring, and miscellaneous accessories necessary for complete installation of and final connections to equipment furnished by Owner, if any, and by other trades.

1.03 RELATED SECTIONS

1. Cutting and Patching.
2. Contract Closeout.
3. Flashing (except cap flashing for roof equipment and ducts).
4. Painting of exposed surfaces including color code painting of piping and conduit.
5. Access panels.
6. Motor power and control wiring.

1.04 WORK NOT INCLUDED

A. Equipment and wiring provided by local Telephone utility and local Power and Light utility.

1.05 DRAWINGS

A. Drawings are diagrammatic and indicate general arrangement of systems and work.

1. Do not scale drawings.
2. Consult architectural drawings, shop drawings and details for exact locations of fixtures, thermostats and equipment.

a. Where these are not definitely located, obtain this information from Project Architect/Engineer in writing prior to any rough-in.

B. Follow drawings in laying out work.

1. Check drawings of other trades to verify spaces in which work will be installed.
2. Maintain maximum headroom clearances and space conditions at all points as required by local codes and regulations.
3. Where headroom or space conditions appear inadequate, obtain instructions from Project Architect/Engineer before proceeding with installation.

C. Make reasonable modifications, without extra charge to Owner, in layout as needed to prevent conflict with work of other trades or for proper execution of work.

D. Engineering drawings are schematic for special equipment since exact dimensions and roughing-in requirements may vary with different manufacturers.

1.06 COOPERATION WITH OTHER TRADES

A. Schedule work and provide temporary service and connections for other trades.

B. Schedule work and provide temporary service and connections so existing systems will not be interrupted when they are required for usage of the existing building(s). Obtain written approval from the Owner at least 14 days prior to any interruption or connection.

C. Perform work at such time and in such manner as to cause minimum inconvenience to the Owner and as approved by the Architect. No allowance will be made for lack of knowledge of existing conditions.

D. Make all arrangements with the utility company for connecting the new services and providing all temporary services.

E. Field painting of exposed conduit and hangers is specified in the Section entitled PAINTING. Clean all surfaces and hanger rods free of grease, scale, rust and other foreign matter ready for painting. Touch up all factory finished, marred in construction, with factory touch-up kits.

F. Correct, without extra charge, electrical work installed in such a manner to cause interference with work of other trades, or to cause unacceptable clearance problems.

1.07 SHOP DRAWINGS AND PRODUCT DATA

A. Shop drawing requirements are specified in the General Conditions of the Contract for Construction.

1. Do not ship apparatus or equipment from stock or fabricate until shop drawings have been accepted by Project Engineer.
2. Submit shop drawings with pertinent data and with identification mark numbers specified or scheduled.
3. Shop drawings without identifications mark numbers or with incomplete performance information will not be reviewed until submission is complete.

B. Submit shop drawings, or product data where permitted, for the following:

1. Shop drawings of switchgear, switchboards, panelboards, transformers, lighting

fixtures, wiring and cable, raceways and wireways, outlet, pull and junction boxes, wiring devices, disconnect switches, fuses and circuit breakers, lightning protection, generator set, sub-base-tank, automatic transfer switch(s) and fire alarm system.

2. Catalog cuts without shop drawings are not acceptable.
3. Submit 1/2" scale layout drawings for main electrical equipment spaces such as closets, switchgear rooms, major conduit bank runs and vaults. Submit layout drawings for review prior to installation of the work.

1.08 RECORD DRAWINGS

A. Keep accurate notes on record drawings of work as actually installed from work as originally indicated, paying particular attention to dimensioning of outside underground lines, their offsets and box locations.

1.09 OPERATING INSTRUCTIONS AND MAINTENANCE MANUALS

A. Upon completion of work and of tests, provide necessary skilled labor and helpers for operating systems and equipment for a period of 3 days of 8 hours each. Instruct Owner's authorized representative(s) in operation, adjustment and maintenance of systems and equipment. Give Owner at least 48 hours notice of proposed instruction period.

B. Before date of Acceptance Inspection, prepare in reproducible form, detailed operating and maintenance manuals for installed equipment and systems.

1. Operating and maintenance manuals shall be used for training of and use by Owner's operating personnel in operation and maintenance of equipment and Electrical systems.
2. Manuals shall address equipment, operation of systems and equipment and parts replacement.

C. Furnish separate manual or chapter for each class of system:

1.10 SUPERVISION

A. Each subcontract trade shall provide services of an experienced superintendent, who shall be constantly in charge of installation of the work.

1.11 INSPECTIONS PRIOR TO OWNER'S ACCEPTANCE INSPECTION

A. Arrange and schedule as many inspections of work as may be necessary and, when appropriate, notify Project Architect/ Engineer, in writing, that safety-to-life systems are functioning in accordance with specifications.

1.12 CERTIFICATES

A. On completion of work, obtain certificates, if required, of compliance, approval or acceptance from authorities having jurisdiction over work and deliver these certificates to Project Architect.

1.13 MANUFACTURER'S NAMEPLATES

A. Each major component of equipment shall have manufacturer's name, address, model number and rating on a plate securely affixed in a conspicuous place.

B. Nameplate of a distributing agent will not be acceptable.

1.14 ACCEPTANCE

A. Operation of mechanical and electrical work by Contractor does not constitute acceptance of work. Acceptance will occur after Contractor has adjusted equipment, demonstrated that it fulfills requirements of specifications and drawings, corrected defects, and has furnished all of required certificates, if any.

1.15 SPECIAL WARRANTIES

A. Manufacturer's Equipment and System Warranties: Provide manufacturer's written warranties which become a part of Contractor's responsibility to Owner in accordance with General Conditions of the Contract for Construction.

B. Manufacturer's Service: Provide manufacturer's service agreements, where required elsewhere in Sections of these specifications.

C. Contractor's Corrections of Work:

1. In addition to foregoing special warranties, any warranties made by Subcontractors to the Contractor are a part of the Contractor's responsibility to the Owner in accordance with General Conditions of the Contract.
2. Correction of work shall include shipping, labor, supervision and related work involved in replacing defective parts or materials provide by manufacturer's under their warranties.

1.16 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver products to job site in manufacturer's original unopened crates or containers, clearly labeled with manufacturer's name, product number and brand. Repair damage sustained by product(s) in transit and handling. If damage sustained while transporting products to job site is unrepairable, replace the product(s) at no cost to Owner.

B. Store and protect materials and equipment to prevent damage of any kind. Keep products dry at all times. Protect exposed metal surfaces with a light oil or silicone coating to prevent rust while in storage.

C. Handle products in such a manner to prevent breakage of containers and damage of any kind.

D. Schedule delivery of materials to job site in accordance with requirements of job progress to avoid delaying work.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. Materials and equivalent required for work shall be new, of good quality, furnished, delivered, erected, connected and finished in every detail, selected and arranged to fit properly into building spaces. Where no specific kind or quality of material is given, provide a good quality standard article as accepted by Project Architect/Engineer.

B. Equipment shall be of type and capacity shown on equipment schedules on drawings and in specifications and shall be as manufactured by one of manufacturers designated or equivalent, accepted in advance by Project Architect/Engineer.

C. For ease of maintenance and parts replacement, use equipment from a single manufacturer to maximum extent possible.

D. Equipment, materials and components shall be new, standard current products of manufacturers regularly engaged in production of such equipment and shall be manufacturer's latest design conforming to specifications. Materials shall be accepted by code enforcing authorities. Materials used in fire rated construction and in electrical work shall be UL listed, with UL labels as specified.

E. Hardware and accessory fitting shall be U.S. Standard sizes designed, intended or appropriate for the use, and complimenting items with which they are used. Furnish with corrosion protection suitable for the atmosphere in which they are installed.

F. Conform to Requirements of General Conditions of the Contract for Construction for coordinating space requirements, mounting arrangement(s) and service connections when substitute equipment is furnished instead of that used as a basis for design. Ascertain before ordering that equipment will fit assigned space and that it can be moved into position without interference from other construction, i.e., check door clearances, ceiling heights, crane access and the like. Be responsible for expenses generated by substitution of equipment used as a basis for design. Maintain clearances as required by the N.E.C.

2.02 IDENTIFICATION OF ELECTRICAL SYSTEM ITEMS

A. Identify electrical equipment and conductors in accordance with following:

1. Distribution Equipment: Major components of distribution system such as circuit breakers, switches, switchboards, panelboards, switchgear shall have nameplates with equipment identification, voltage and phase ratings and source of feed or circuit utilization. Equipment identification shall correspond to the designation on single line diagram. Panelboards shall have typed directories.
2. Starters, Disconnect Switches and Controls: Provide laminated phenolic nameplates with white letters on a black field secured with flush fastenings identifying equipment served.
3. Conductors: Color code wire and cable for feeders and branch circuits as follows unless otherwise required by local codes or electric utility company.

PHASE	208Y/120V
A	Black
B	Red
C	Blue
Neutral	White
Ground	Green

4. Ground Fault Protected Devices:

   a. Identify devices protected by ground fault interrupters.
   b. Receptacles, not otherwise identified by manufacturer, shall have cover plates with words "Protected by GFI" and "Test Before Using" engraved thereon.

2.03 UNDERWRITERS' LABORATORIES LISTING AND LABELS

A. Where materials and equipment are available under continuing inspection and labeling of UL, provide such material and equipment.

B. Listing by Underwriters' Laboratories shall be evidenced by label or:

UL - Electrical Construction Materials List (Green Book).
UL - Electrical Appliance and Utilization Equipment List.
UL - Building Materials List.

PART 3 EXECUTION

3.01 INSPECTION

A. Verify/examine that the surfaces, substrates, and conditions are satisfactory to receive electrical general provisions, and are free from deviations/defects affecting quality of the work.

B. Notify Contractor in writing of conditions detrimental to proper/timely completion of the work.

C. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to installer.

D. Beginning of installation will be construed as acceptance of existing substrates, surfaces, and conditions.

3.02 EQUIPMENT INSTALLATION

A. Obtain services of manufacturer's representatives of major electrical equipment at job site during erection or construction of their equipment to insure proper installation. Failure to have such checks made by manufacturers shall place full responsibility for proper installation on Contractor who shall make any corrections or remedy defects at no additional cost to Owner.

B. Where necessary to meet space conditions bring equipment to its ultimate location in pieces or otherwise disassembled, then assemble it in place. Provide flanges, studs and the like for matching, alignment and field assembly.

C. Conduct field tests of equipment after assembly and during under direct supervision of manufacturer's representative. Upon satisfactory conclusion of field tests, manufacturer shall furnish, for each such apparatus or equipment, a written statement certifying that there has been neither invalidation of any warranties or guaranties, nor impairment of capacity or functioning of apparatus or equipment. Field tests shall be in addition to all factory tests, shop tests and final tests and adjustments.

D. Avoid field assembly wherever possible by suitable scheduling of the general construction work.

1. Extra compensation will not be allowed for those cases where it is necessary to field assemble equipment or apparatus.

3.03 FABRICATION AND INSTALLATION

A. Workers: Use thoroughly trained and experienced workers, completely familiar with items to be installed and manufacturer's current recommended methods of installations.

B. Set equipment level, properly aligned and bolted together where in sections. Secure equipment and materials firmly in place. Screws, bolts, nuts, clamps, fittings or other fastening devices shall be made up tight.

C. Repair to a new condition, or replace materials damaged during delivery, storage or installation. Touch-up scratched or marred finishes on equipment to match original finish or completely refinish.

D. Factory paint or finish enclosures, panels, cabinets, relays, safety switches, fixtures and other exposed equipment or accessories except as indicated otherwise. Group mounted items shall be similar in finish and color.

E. Make connections for air conditioning and ventilating equipment and controls. Follow manufacturers recommendations and system requirements when no other information available.

F. Support electrical raceways, conduits and light fixtures from overhead structure, not from ducts, pipes, conduits or the like. Support piping and HVAC ducts from overhead structure, not from ducts, pipes, conduits or equipment.

G. In order to use same means of support for electrical and mechanical items, design combined support system and coordinate to safely support suspended items.

3.04 HOUSEKEEPING

A. Clean exposed surfaces raceways and equipment which have become covered with dirt, plaster or other material during handling and construction before such surfaces are prepared for painting or enclosed within building structure,

B. Keep raceway openings closed by means of plugs or caps to prevent entrance of foreign matter.

1. Cover fixtures, equipment and apparatus to protect them against dirt, water, chemical or mechanical damage both before and after installation.
2. Damaged fixtures, equipment or apparatus shall be restored to its original condition or replaced at no cost to Owner.

3.05 EXCAVATION AND BACKFILLING

A. Excavation, backfilling and compaction of trenches required for the installation of electrical services and to points of connection with exterior underground utilities outside of the building shall be performed as specified in Trenching, Backfilling and Compaction for Utilities - Refer to Division 2 sections.

3.06 SLEEVES BLOCKOUTS, CUTTING AND PATCHING, CORING AND DRILLING

A. Sleeves:

1. All conduits passing through concrete slabs shall be provided with sleeves.
2. All conduits passing through interior concrete or masonry walls and partitions shall be provided with sleeves.
3. Where pipe motion due to expansion and contraction will occur, sleeves shall be of sufficient diameter to permit free movement of pipe.

B. Cutting and Patching:

1. Cut and patch as needed for installation of electrical equipment. Perform finish patching according to specifications for each finish, by mechanics skilled in each type finish.
2. Install work so that no undue cutting and patching will be required in building construction. Do no cutting that may impair strength of building construction. Install work in various portions of building as construction progresses. Do not delay construction of building.
3. Cut and patch as needed for conduits where sleeves and inserts were not installed, or where incorrectly located.
4. Provide for cutting out holes in structural steel webs (number, size and location) by means of shop drawing submittal and review only as approved by Project Architect/Engineer. Reinforce holes as directed by Project Architect/Engineer.

C. Coring and Drilling:

1. If a sleeve is omitted, core drill to permit insertion of a pipe sleeve with sufficient clearance to permit grouting in place with specified backer rod and sealant space between the line and sleeve.
2. When core drilling or cutting duct holes in foundations, walls, beams, columns or structural slabs, determine the location of reinforcement and tendons before coring.
3. Holes, except for small screws, may not be drilled in beams or other structural members, without obtaining prior acceptance of Project Architect/Engineer.

3.07 WATERPROOFING AND ROOFING

A. Where electrical work penetrates building envelope, or any waterproofed construction, method of installation shall be performed in a manner to prevent transmission of water, heat, cold and drafts.

B. Follow details, including architectural, which establish types of waterproofing construction for each penetration condition.

C. Where a detail suitable to encountered condition is lacking, request instructions from Project Architect/Engineer.

D. Provide necessary sleeves, sealing and flashing required to make opening watertight

3.08 FINAL TESTING, ADJUSTMENTS AND ACCEPTANCE OF ELECTRICAL EQUIPMENT AND SYSTEMS

A. Schedule testing and cleared through Project Architect/Engineer.

1. No testing of any kind shall be done or scheduled without clearance by Project Architect/Engineer.
2. Furnish Project Architect/Engineer with name of person who will be in charge of testing, energizing and start-up.
3. Confer with Project Architect/Engineer on procedures to be followed in obtaining clearances for electrical equipment.
4. Procedures as finally agreed upon shall be adhered to.

B. Complete test and inspection records shall be made and incorporated into a report for each piece of equipment tested. Record readings taken. Submit four copies to Project Architect for review.

C. Notify Project Architect in writing at least one week prior to test, establishing time that test is to be performed.

1. Perform tests in presence of Project Architect/Engineer.

D. Furnish necessary meters, instruments, temporary wiring and labor to perform required tests and adjustments of equipment and wiring including electrical equipment furnished by others, to determine proper polarity, phasing, freedom from grounds and shorts and operation of equipment. Measuring instruments shall be properly calibrated.

E. Demonstrate materials and manner of installation to be in accordance with the requirements of state and local public authorities, the utility company and NFPA.

F. Energize equipment following established procedures after certification by the Contractor that the installation is satisfactory.

G. Wiring:

1. Check system and equipment grounds for resistance using the Megger ground tester in accordance with manufacturer's instructions. Investigate circuits showing insulation resistance less than minimum values given in N.E.C. Correct weak points.
2. Overall resistance of the ground system shall be no greater than 25 ohms. Inspect grounding system to ensure that above-ground cables and connections are suitably protected. Provide additional ground rod, if needed, to obtain the specified resistance.
3. Make ground resistance tests at test points designated by the Project Architect/Engineer. Make ground resistance tests in accordance with James G. Biddle Company Bulletins 25T2 and 25-J.
4. Correct or replace nominal current-carrying circuits which are defective or grounded. Correct other troubles encountered in these tests.

H. Breakers: Set breakers so equipment will be in proper operating condition before being placed in service. Perform final operational tests to determine that wiring connections are correct.

I. Lighting:

1. Check lighting fixtures and receptacles for proper operation. At completion of work, clean fixtures and lenses and replace missing and burned out lamps.

J. Motors:

1. Make these tests on motors before start-up: Check motor nameplates for HP, speed, phase and voltage. Check bearings to see if they are filled with oil or grease. Lubricate. Check coupling alignment and shaft end-play.
2. Make these tests on motors during start-up:

    a. Check shaft rotation before final connections are made. Check for bearing temperature and smooth operation.
    b. Take a current reading at full load using a clamp-on ammeter. If ammeter is over the rated full load current, determine reason for the discrepancy and take corrective action.

3. After all connections are made, test motors and equipment for proper operation. Investigate cause of any motor operating above full load rating and remove cause, or report to Project Architect/Engineer instead of increasing overload heater rating. Check rotation of motors.
4. Check overload elements in motor starters for suitability to the motor characteristics. Replace any overload element that does not conform to starter manufacturer's recommendations based on actual nameplate current rating of the motor. Investigate the cause of any motor operating above full load rating and correct. Under no circumstances shall oversize overload relay trip rating be substituted.

K. Transformers: Megger winding insulation resistance, primary and secondary-to-ground and primary-to-secondary. Windings shall exhibit resistance in megohms equal to eight times the voltage rating of the winding in kV.

L. Control and Alarms: Check control and alarm circuits for proper operation. Test

switchgear, switchboards, fire alarm system, as specified in each Section.

M. Service Voltage: Check service voltage at no-load and at full load on the distribution system. The objective shall be to maintain the equipment terminal voltage at less than 10% above nameplate rating at full system load. Then set transformer no-load taps so that at normal loading the average operating voltages at the terminals of all utilization equipment matches the nameplate voltage of that equipment as closely as possible.

N. Test all circuits, which under any circumstances can be paralleled, for proper phasing using hot phasing.

O. Acceptance: Observation of the operation of the electrical installation and equipment by the Project Architect/Engineer does not constitute acceptance of the Work. Acceptance will be made after the Contractor has adjusted his equipment, demonstrated that it meets the requirements of the Contract Document, and has furnished all the required certificates.

3.10 TOOLS AND SPARE PARTS

A. Use only tools designed for each operation. Keep tools in good condition. Do not use worn or broken tools. Wrench and vise teeth shall be sharp and clean to prevent damage to the materials. Screw drivers and wrenches shall be of the proper size to prevent damage to head or nuts.

B. Deliver special tools and spare parts provided with equipment to an authorized representative of the Owner. Obtain signed and dated receipts.

3.11 DEMONSTRATION

A. Demonstrate the essential features of the following mechanical and electrical systems upon completion of satisfactory testing:

1. Power System.
2. Lighting System..

B. Hold the demonstrations in the presence of the Owner or his designated representatives and the Project Architect/Engineer to show functions, locations and relationships to the Drawings. Demonstrate how to "start-stop", reset, replace, and emergency procedures. Demonstrate one system at a time.

3.12 EXISTING CONDITIONS

A. All work herein described and shown on drawings and required to make project complete in every respect, plus any and all patching necessary shall be done to the complete satisfaction of the Project Architect/Engineer and shall be accomplished in strict accordance with the drawings and technical specifications. All materials shall match existing where applicable and all construction and alteration left in new condition.

B. All items to be removed shall be removed with utmost care and without damage, and those items not designated to be reused shall be delivered to the Owner or disposed of as per his written instructions.

C. All alterations, demolition, and removal, cutting and patching and other work necessary for construction of this contract shall be performed without additional cost to the Owner. This shall include removal, rerouting, etc., of all electrical items required to complete installation intended.

D. Patch or replace all damaged floor, wall, ceiling, etc. surfaces altered to accommodate the new construction. Patched surfaces shall match existing adjacent surfaces.

E. All cutting, patching, demolition, repairing, replacing etc., necessary under this Contract shall be coordinated by the General Contractor. Where applicable, coordinate work with utility companies, local and state authorities having jurisdiction, Owner's representative and all applicable codes.

F. Where alterations take place in occupied areas, Contractor shall clean up daily, and noise shall be kept to a minimum.

G. None of the services to existing buildings shall be disrupted in any way except with the express permission of the Owner.

H. All equipment presently "hot" and required to be maintained shall be returned to this condition after performing the changes to existing building. Reroute conduits and extend or replace circuits as required. Perform work at convenience of the Owner.

I. Execute all work in such a manner and to avoid interference with the use of passage to and from adjoining buildings or areas.

J. The Contractor shall be fully responsible for any damage to existing building and to contents thereof including machinery, furniture, equipment, etc., and damage to buildings or contents thereof due to Contractor operations shall be repaired or replaced at direction of Project Architect/Engineer, by the Contractor, at no extra cost to the Owner.

K. Connection to existing structures shall be made in such a manner that as little time as absolutely possible will be taken, and Contractor will be required to coordinate fully with Owner in connection with convenience and safety of all persons involved, including employees.

L. Prior to commencement of work, verify measurements of building site. Submit discrepancies and differences to Architect/Engineer for consideration and decision before proceeding.

M. Obtain full information regarding peculiarities and limitations of space available for installation of all materials under contract. No extras will be allowed for any rework due to failure to bring this to the engineer's attention prior to rough-in.

END OF SECTION

SECTION 26 0023

CODES AND STANDARDS

PART 1 GENERAL

1.01 REFERENCES

A. Comply with the latest edition, unless otherwise specifically noted, all or portions of the following codes and requirements:

1. The Florida Building Code (FBC)
2. The Standard Building Code, (SBC)
3. National Electric Code, (NEC)
4. NFPA, Life Safety Code and all other related NFPA codes
5. ANSI A117.1
6. ANSI A58.1 Wind Load Provisions

B. In addition to the foregoing the following shall apply:

1. Where materials and equipment are available under the continuing inspection and listing service of Underwriter's Laboratories, Inc., furnish materials and equipment so listed.

2. It is the contractors responsibility to be fully cognizant with all code sections as they apply to the work/installation at hand whether or not shown on the drawings but required by code. If any discrepancy arises between any design issues and code requirements, contractor must adhere to the most stringent approach.

PART 2 PRODUCTS NOT USED

PART 3EXECUTION NOT USED

END OF SECTION

SECTION 26 0526

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes grounding and bonding systems and equipment.

1.02 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.03 RELATED DOCUMENTS

A. Contaminated Groundwater and Soil Management Plan
   1. Prior to any and all construction activities, the contractor is responsible for verifying if location of construction activities are subject to environmental land use controls (LUC). Any and all encountered contaminated soil and or groundwater shall be handled per the “soil and ground water management plan”, dated February 13, 2015 included in the project manual. Contractor shall verify that LUC construction permit has been filed and approved for this work.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Erico

B. Burndy

2.02 SYSTEM DESCRIPTION

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with UL 467 for grounding and bonding materials and equipment.

2.03 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.
4. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.

2.04 CONNECTORS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

D. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless exothermic-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

2.05 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel, sectional type; 3/4 inch by 10 feet.

PART 3 - EXECUTION

3.01 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.

B. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
3. Connections to Ground Rods at Test Wells: CAD-WELD connectors.
4. Connections to Structural Steel: Welded connectors.

3.02 GROUNDING AT THE SERVICE

A. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

3.03 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

A. Comply with IEEE C2 grounding requirements.

B. Grounding Manholes and Handholes: Install a driven ground rod through manhole or handhole floor, close to wall, and set rod depth so 4 inches will extend above finished floor. If necessary, install ground rod before manhole is placed and provide No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inches above to 6 inches below concrete. Seal floor opening with waterproof, nonshrink grout.

C. Grounding Connections to Manhole Components: Bond exposed-metal parts such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, stranded, hard-drawn copper bonding conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields according to written instructions by manufacturer of splicing and termination kits.

3.04 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:

1. Feeders and branch circuits.
2. Lighting circuits.
3. Receptacle circuits.
4. Single-phase motor and appliance branch circuits.
5. Three-phase motor and appliance branch circuits.
6. Flexible raceway runs.

C. Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

3.05 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.

C. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.

D. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Section 260533 "Raceways and Boxes for Electrical Systems," and shall be at least 12 inches deep, with cover.

1. Test Wells: Install at least one test well for each service unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.

E. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.

3.06 FIELD QUALITY CONTROL

A. Perform tests and inspections. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.

END OF SECTION

SECTION 26 0529

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Hangers and supports for electrical equipment and systems.
2. Construction requirements for concrete bases.

1.02 PERFORMANCE REQUIREMENTS

A. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

1.03 ACTION SUBMITTALS

A. Product Data: For steel slotted support systems.

1. Trapeze hangers. Include Product Data for components.
2. Steel slotted channel systems. Include Product Data for components.
3. Equipment supports.

1.04 QUALITY ASSURANCE

A. Comply with NFPA 70.

PART 2 - PRODUCTS

2.01 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

1. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
2. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
3. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
4. Channel Dimensions: Selected for applicable load criteria.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

2.02 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

B. Materials: Comply with requirements in Section 055000 "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.01 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slottedsupport system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with two-bolt conduit clamps single-bolt conduit clamps single-bolt conduit clamps using spring friction action for retention in support channel.

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.02 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

C. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.
5. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69 Spring-tension clamps.
6. To Light Steel: Sheet metal screws.
7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.

D. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.03 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Comply with installation requirements in Section 055000 "Metal Fabrications" for site-fabricated metal supports.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

C. Field Welding: Comply with AWS D1.1/D1.1M.

3.04 CONCRETE BASES

A. Construct concrete bases of dimensions indicated but not less than 4 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.

B. Use 3000-psi, 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Section 033000 "Cast-in-Place Concrete." Section 033053 "Miscellaneous Cast-in-Place Concrete."

C. Anchor equipment to concrete base.

1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor bolts to elevations required for proper attachment to supported equipment.
3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.05 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.

B. Touchup: Comply with requirements in Section 099000 “Painting and Coating” and Section 099610 “High Performance Coatings for Steel” for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION

SECTION 26 0533

RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Metal conduits, tubing, and fittings.
2. Nonmetal conduits, tubing, and fittings.
3. Metal wireways and auxiliary gutters.
4. Nonmetal wireways and auxiliary gutters.
5. Surface raceways.
6. Boxes, enclosures, and cabinets.
7. Handholes and boxes for exterior underground cabling.
8. Freestanding weatherproof panel enclosure

B. Related Requirements:

1. Section 260526 "Grounding and Bounding for Electrical Systems"

1.02 ACTION SUBMITTALS

A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

1.03 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of items involved:

1. Structural members in paths of conduit groups with common supports.
2. HVAC and plumbing items and architectural features in paths of conduit groups with common supports.

PART 2 - PRODUCTS

2.01 METAL CONDUITS, TUBING, AND FITTINGS

A. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. GRC: Comply with ANSI C80.1 and UL 6.

C. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.

1. Comply with NEMA RN 1.
2. Coating Thickness: 0.040 inch, minimum.

D. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.02 NONMETALLIC CONDUITS, TUBING, AND FITTINGS

A. Listing and Labeling: Nonmetallic conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. ENT: Comply with NEMA TC 13 and UL 1653.

C. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.

D. LFNC: Comply with UL 1660.

E. Fittings for ENT and RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.

F. Fittings for LFNC: Comply with UL 514B.

2.03 METAL WIREWAYS AND AUXILIARY GUTTERS

A. Description: Sheet metal, complying with UL 870 and NEMA 250, unless otherwise indicated, and sized according to NFPA 70.

1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

2.04 SURFACE RACEWAYS

A. Listing and Labeling: Surface raceways and tele-power poles shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Surface Metal Raceways: Galvanized steel with snap-on covers complying with UL 5.

2.05 BOXES, ENCLOSURES, AND CABINETS

A. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.

B. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.

C. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, aluminum, Type FD, with gasketed cover.

D. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.

E. Device Box Dimensions 4 inches by 2-1/8 inches by 2-1/8 inches deep.

2.06 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

A. General Requirements for Handholes and Boxes:

1. Boxes and handholes for use in underground systems shall be designed and identified as defined in NFPA 70, for intended location and application.
2. Boxes installed in wet areas shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel, fiberglass, or a combination of the two.

1. Standard: Comply with SCTE 77.
2. Configuration: Designed for flush burial with open bottom unless otherwise indicated.
3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.
4. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
5. Cover Legend: Molded lettering, "ELECTRIC."

PART 3 - EXECUTION

3.01 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed Conduit: GRC.
2. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFNC.
3. Boxes and Enclosures, Aboveground: NEMA 250, Type 4.

B. Minimum Raceway Size: 3/4-inch trade size.

C. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits

and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.

3. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

D. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.

E. Install surface raceways only where indicated on Drawings.

F. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F.

3.02 INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.

B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

C. Arrange stub-ups so curved portions of bends are not visible above finished slab.

D. Install no more than the equivalent of four 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.

E. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.

F. Support conduit within 12 inches of enclosures to which attached.

G. Raceways Embedded in Slabs:

1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot intervals.
2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
3. Arrange raceways to keep a minimum of 2 inches of concrete cover in all directions.
4. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.

H. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

I. Coat field-cut threads on PVC-coated raceway with a corrosion-preventing conductive compound prior to assembly.

J. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.

K. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.

L. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.

M. Surface Raceways:

1. Install surface raceway with a minimum 2-inchradius control at bend points.
2. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inches and with no less than two supports per straight raceway section. Support surface raceway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.

N. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces.

O. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
1. Where an underground service raceway enters a building or structure.
2. Where otherwise required by NFPA 70.

P. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.

Q. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between the box and cover plate or the supported equipment and box.

R. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.

S. Locate boxes so that cover or plate will not span different building finishes.

T. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

3.03 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Section 312000 "Earth Moving" for pipe less than 6 inches in nominal diameter.
2. Install backfill as specified in Section 312000 "Earth Moving."

3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Section 312000 "Earth Moving."
4. Install manufactured duct elbows for stub-up at poles and equipment and at building entrances through floor unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.

    a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete for a minimum of 12 inches on each side of the coupling.
    b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.

5. Underground Warning Tape: Comply with requirements in Section 260553 "Identification for Electrical Systems."

3.04 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.

B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.

C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.

D. Install handholes with bottom below frost line, below grade.

E. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.05 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION

SECTION 26 0543
UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

SECTION 26 0543NDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

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. Direct-buried conduit, ducts, and duct accessories.
2. Concrete-encased conduit, ducts, and duct accessories.
3. Handholes and boxes.
4. Manholes.

1.03 DEFINITIONS

A. Traffic ways: Locations where vehicular or pedestrian traffic is a normal course of events.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include duct-bank materials, including separators and miscellaneous components.
2. Include ducts and conduits and their accessories, including elbows, end bells, bends, fittings, and solvent cement.
3. Include accessories for manholes, handholes, boxes, and other utility structures.
4. Include warning tape.
5. Include warning planks.

B. Shop Drawings:

1. Precast or Factory-Fabricated Underground Utility Structures:

a. Include plans, elevations, sections, details, attachments to other work, and accessories.
b. Include duct entry provisions, including locations and duct sizes.
c. Include reinforcement details.
d. Include frame and cover design and manhole frame support rings.
e. Include Ladder Step details.
f. Include grounding details.

g. Include dimensioned locations of cable rack inserts, pulling-in and lifting irons, and sumps.
h. Include joint details.

2. Factory-Fabricated Handholes and Boxes Other Than Precast Concrete:

a. Include dimensioned plans, sections, and elevations, and fabrication and installation details.
b. Include duct entry provisions, including locations and duct sizes.
c. Include cover design.
d. Include grounding details.
e. Include dimensioned locations of cable rack inserts, and pulling-in and lifting irons.

1.05 INFORMATIONAL SUBMITTALS

A. Duct-Bank Coordination Drawings: Show duct profiles and coordination with other utilities and underground structures.

1. Include plans and sections, drawn to scale, and show bends and locations of expansion fittings.
2. Drawings shall be signed and sealed by a qualified professional engineer.

B. Product Certificates: For concrete and steel used in precast concrete manholes and handholes, as required by ASTM C 858.

C. Qualification Data: For professional engineer and testing agency responsible for testing nonconcrete handholes and boxes.

D. Source quality-control reports.

E. Field quality-control reports.

1.06 MAINTENANCE MATERIALS SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

B. Furnish cable-support stanchions, arms, insulators, and associated fasteners in quantities equal to 5 percent of quantity of each item installed.

1.07 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

1.08 FIELD CONDITIONS

A. Ground Water: Assume ground-water level is at grade level unless a lower water table is noted on Drawings.

B. Ground Water: Assume ground-water level is 36 inches below ground surface unless a higher water table is noted on Drawings.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS FOR DUCTS AND RACEWAYS

A. Comply with ANSI C2.

2.02 CONDUIT

A. Rigid Steel Conduit: Galvanized. Comply with ANSI C80.1.

B. RNC: NEMA TC 2, Type EPC-40-PVC, UL 651, with matching fittings by same manufacturer as the conduit, complying with NEMA TC 3 and UL 514B.

2.03 NONMETALLIC DUCTS AND DUCT ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ARNCO Corp.
2. Beck Manufacturing.
3. Cantex, Inc.
4. CertainTeed Corporation.
5. Condux International, Inc.
6. ElecSys, Inc.
7. Electri-Flex Company.
8. IPEX Inc.
9. Lamson & Sessions; Carlon Electrical Products.
10. Spiraduct/AFC Cable Systems, Inc.

B. Underground Plastic Utilities Duct: NEMA TC 2, UL 651, ASTM F 512, Type EPC-40, with matching fittings complying with NEMA TC 3 by same manufacturer as the duct.

C. Duct Accessories:

1. Duct Separators: Factory-fabricated rigid PVC interlocking spacers, sized for type and size of ducts with which used, and selected to provide minimum duct spacing indicated while supporting ducts during concreting or backfilling.
2. Warning Tape: Underground-line warning tape specified in Section 260553 "Identification for Electrical Systems."

3. Concrete Warning Planks: Nominal 12 by 24 by 3 inches in size, manufactured from 6000-psi concrete.

    a. Color: Red dye added to concrete during batching.
    b. Mark each plank with "ELECTRIC" in 2-inch-high, 3/8-inch-deep letters.

2.04 PRECAST CONCRETE HANDHOLES AND BOXES

A. Manufacturers: Subject to compliance with requirements,

1. Christy Concrete Products.
2. Elmhurst-Chicago Stone Co.
3. Oldcastle Precast Group.
4. Rinker Group, Ltd.
5. Riverton Concrete Products.
6. Utility Concrete Products, LLC.
7. Utility Vault Co.
8. Wausau Tile Inc.
9. Brooks

B. Comply with ASTM C 858 for design and manufacturing processes.

C. Description: Factory-fabricated, reinforced-concrete, monolithically poured walls and bottom unless open-bottom enclosures are indicated. Frame and cover shall form top of enclosure and shall have load rating consistent with that of handhole or box.

1. Frame and Cover: Weatherproof cast-iron frame, with cast-iron cover with recessed cover hook eyes and tamper-resistant, captive, cover-securing bolts.
2. Frame and Cover: Weatherproof steel frame, with steel cover with recessed cover hook eyes and tamper-resistant, captive, cover-securing bolts.
3. Frame and Cover: Weatherproof steel frame, with hinged steel access door assembly with tamper-resistant, captive, cover-securing bolts.

    a. Cover Hinges: Concealed, with hold-open ratchet assembly.
    b. Cover Handle: Recessed.

4. Frame and Cover: Weatherproof aluminum frame with hinged aluminum access door assembly with tamper-resistant, captive, cover-securing bolts.

    a. Cover Hinges: Concealed, with hold-open ratchet assembly.
    b. Cover Handle: Recessed.

5. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
6. Cover Legend: Molded lettering, **"ELECTRIC."**
7. Configuration: Units shall be designed for flush burial and have open bottom unless otherwise indicated.
8. Extensions and Slabs: Designed to mate with bottom of enclosure. Same material as enclosure.

    a. Extension shall provide increased depth of 12 inches.

b. Slab: Same dimensions as bottom of enclosure, and arranged to provide closure.

9. Joint Sealant: Asphaltic-butyl material with adhesion, cohesion, flexibility, and durability properties necessary to withstand maximum hydrostatic pressures at the installation location with the ground-water level at grade.
10. Windows: Precast openings in walls, arranged to match dimensions and elevations of approaching ducts and duct banks, plus an additional 12 inches vertically and horizontally to accommodate alignment variations.

    a. Windows shall be located no less than 6 inches from interior surfaces of walls, floors, or frames and covers of handholes, but close enough to corners to facilitate racking of cables on walls.
    b. Window opening shall have cast-in-place, welded-wire fabric reinforcement for field cutting and bending to tie in to concrete envelopes of duct banks.
    c. Window openings shall be framed with at least two additional No. 3 steel reinforcing bars in concrete around each opening.

11. Duct Entrances in Handhole Walls: Cast end-bell or duct-terminating fitting in wall for each entering duct.

    a. Type and size shall match fittings to duct or conduit to be terminated.
    b. Fittings shall align with elevations of approaching ducts and be located near interior corners of handholes to facilitate racking of cable.

2.05 HANDHOLES AND BOXES OTHER THAN PRECAST CONCRETE

A. General Requirements for Handholes and Boxes: Comply with SCTE 77. Comply with tier requirements in "Underground Enclosure Application" Article.

1. Color: Gray.
2. Configuration: Units shall be designed for flush burial and have open bottom unless otherwise indicated.
3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.
4. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
5. Cover Legend: Molded lettering, As indicated for each service.
6. Direct-Buried Wiring Entrance Provisions: Knockouts equipped with insulated bushings or end-bell fittings, selected to suit box material, sized for wiring indicated, and arranged for secure, fixed installation in enclosure wall.
7. Duct Entrance Provisions: Duct-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.

B. Polymer Concrete Handholes and Boxes with Polymer Concrete Cover: Molded of sand and aggregate, bound together with a polymer resin, and reinforced with steel or fiberglass or a combination of the two.

1. Manufacturers: Subject to compliance with requirements,:

    a. Armorcast Products Company.
    b. Carson Industries LLC.

c. NewBasis.
d. Quazite: Hubbell Power System, Inc.
e. Brooks

C. Fiberglass Handholes and Boxes with Polymer Concrete Frame and Cover: Sheet-molded, fiberglass-reinforced, polyester resin enclosure joined to polymer concrete top ring or frame.

1. Manufacturers: Subject to compliance with requirements,:

a. Armorcast Products Company.
b. Carson Industries LLC.
c. Christy Concrete Products.
d. Quazite: Hubbell Power System, Inc.
e. Synertech Moulded Products, Inc.
f. Brooks

D. Fiberglass Handholes and Boxes: Molded of fiberglass-reinforced polyester resin, with covers made of fiberglass.

1. Manufacturers: Subject to compliance with requirements,:

a. Carson Industries LLC.
b. Christy Concrete Products.
c. Nordic Fiberglass, Inc.
d. Quazite: Hubbell Power System, Inc.

PART 3 - EXECUTION

3.01 PREPARATION

A. Coordinate layout and installation of ducts, manholes, handholes, and boxes with final arrangement of other utilities, site grading, and surface features as determined in the field. Notify Architect if there is a conflict between areas of excavation and existing structures or archaeological sites to remain.

B. Coordinate elevations of ducts and duct-bank entrances into manholes, handholes, and boxes with final locations and profiles of ducts and duct banks, as determined by coordination with other utilities, underground obstructions, and surface features. Revise locations and elevations as required to suit field conditions and to ensure that duct runs drain to manholes and handholes, and as approved by Architect.

C. Clear and grub vegetation to be removed, and protect vegetation to remain according to Section 311000 "Site Clearing." Remove and stockpile topsoil for reapplication according to Section 311000 "Site Clearing."

3.02 UNDERGROUND DUCT APPLICATION

A. Ducts for Electrical Feeders 600 V and Less: RNC, NEMA Type EPC-40-PVC, in concrete-encased duct bank unless otherwise indicated.

B. Ducts for Electrical Feeders 600 V and Less: RNC, NEMA Type EPC-40-PVC, in direct-buried duct bank unless otherwise indicated.

C. Ducts for Electrical Branch Circuits: RNC, NEMA Type EPC-40-PVC, in direct-buried duct bank unless otherwise indicated.

D. Underground Ducts Crossing Paved Paths Walks and Driveways Roadways and Railroads: RNC, NEMA Type EPC-40-PVC, encased in reinforced concrete.

3.03 EARTHWORK

A. Excavation and Backfill: Comply with Section 312000 "Earth Moving," but do not use heavy-duty, hydraulic-operated, compaction equipment.

B. Restore surface features at areas disturbed by excavation, and re-establish original grades unless otherwise indicated. Replace removed sod immediately after backfilling is completed.

C. Restore areas disturbed by trenching, storing of dirt, cable laying, and other work. Restore vegetation and include necessary topsoiling, fertilizing, liming, seeding, sodding, sprigging, and mulching. Comply with Section 329200 "Turf and Grasses" and Section 329300 "Plants."

D. Cut and patch existing pavement in the path of underground ducts and utility structures according to the "Cutting and Patching" Article in Section 017300 "Execution."

3.04 DUCT INSTALLATION

A. Install ducts according to NEMA TCB 2.

B. Slope: Pitch ducts a minimum slope of 1:300 down toward manholes and handholes and away from buildings and equipment. Slope ducts from a high point in runs between two manholes, to drain in both directions.

C. Curves and Bends: Use 5-degree angle couplings for small changes in direction. Use manufactured long sweep bends with a minimum radius of 48 inches, both horizontally and vertically, at other locations unless otherwise indicated.

D. Joints: Use solvent-cemented joints in ducts and fittings and make watertight according to manufacturer's written instructions. Stagger couplings so those of adjacent ducts do not lie in same plane.

E. Installation Adjacent to High-Temperature Steam Lines: Where duct banks are installed parallel to underground steam lines, perform calculations showing the duct bank will not be subject to environmental temperatures above 40 deg C. Where environmental temperatures are calculated to rise above 40 deg C, and anywhere the duct bank crosses above an underground

steam line, install insulation blankets listed for direct burial to isolate the duct bank from the steam line.

F. Duct Entrances to Manholes and Concrete and Polymer Concrete Handholes: Use end bells, spaced approximately 10 inches o.c. for 5-inch ducts, and vary proportionately for other duct sizes.

1. Begin change from regular spacing to end-bell spacing 10 feet from the end bell without reducing duct line slope and without forming a trap in the line.
2. Direct-Buried Duct Banks: Install an expansion and deflection fitting in each conduit in the area of disturbed earth adjacent to manhole or handhole. Install an expansion fitting near the center of all straight line direct-buried duct banks with calculated expansion of more than 3/4 inch.
3. Grout end bells into structure walls from both sides to provide watertight entrances.

G. Building Wall Penetrations: Make a transition from underground duct to rigid steel conduit at least 10 feet outside the building wall, without reducing duct line slope away from the building, and without forming a trap in the line. Use fittings manufactured for duct-to-conduit transition. Install conduit penetrations of building walls as specified in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

H. Sealing: Provide temporary closure at terminations of ducts that have cables pulled. Seal spare ducts at terminations. Use sealing compound and plugs to withstand at least 15-psig hydrostatic pressure.

I. Pulling Cord: Install 100-lbf-test nylon cord in empty ducts.

J. Concrete-Encased Ducts: Support ducts on duct separators.

1. Excavate trench bottom to provide firm and uniform support for duct bank. Prepare trench bottoms as specified in Section 312000 "Earth Moving" for pipes less than 6 inches in nominal diameter.
2. Width: Excavate trench 12 inches wider than duct bank on each side.
3. Width: Excavate trench 3 inches wider than duct bank on each side.
4. Depth: Install top of duct bank at least 24 inches below finished grade in areas not subject to deliberate traffic, and at least 30 inches below finished grade in deliberate traffic paths for vehicles unless otherwise indicated.
5. Support ducts on duct separators coordinated with duct size, duct spacing, and outdoor temperature.
6. Separator Installation: Space separators close enough to prevent sagging and deforming of ducts, with not less than [**four**] [**five**] spacers per 20 feet of duct. Secure separators to earth and to ducts to prevent floating during concreting. Stagger separators approximately 6 inches between tiers. Tie entire assembly together using fabric straps; do not use tie wires or reinforcing steel that may form conductive or magnetic loops around ducts or duct groups.
7. Minimum Space between Ducts: 3 inches between ducts and exterior envelope wall, 2 inches between ducts for like services, and 4 inches between power and signal ducts.
8. Elbows: Use manufactured duct elbows for stub-ups at poles and equipment, at building entrances through floor, and at changes of direction in duct run unless otherwise indicated. Extend concrete encasement throughout length of elbow.

9. Elbows: Use manufactured rigid steel conduit elbows for stub-ups at poles and equipment, at building entrances through floor, and at changes of direction in duct run.

    a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete.
    b. Stub-Ups to Equipment: For equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches from edge of base. Install insulated grounding bushings on terminations at equipment.

10. Reinforcement: Reinforce concrete-encased duct banks where they cross disturbed earth and where indicated. Arrange reinforcing rods and ties without forming conductive or magnetic loops around ducts or duct groups.
11. Forms: Use walls of trench to form side walls of duct bank where soil is self-supporting and concrete envelope can be poured without soil inclusions; otherwise, use forms.
12. Concrete Cover: Install a minimum of 3 inches of concrete cover at top and bottom, and a minimum of 2 inches on each side of duct bank.
13. Concreting Sequence: Pour each run of envelope between manholes or other terminations in one continuous operation.

    a. Start at one end and finish at the other, allowing for expansion and contraction of ducts as their temperature changes during and after the pour. Use expansion fittings installed according to manufacturer's written recommendations, or use other specific measures to prevent expansion-contraction damage.
    b. If more than one pour is necessary, terminate each pour in a vertical plane and install 3/4-inch reinforcing-rod dowels extending a minimum of 18 inches into concrete on both sides of joint near corners of envelope.

14. Pouring Concrete: Comply with requirements in "Concrete Placement" Article in Section 033000 "Cast-in-Place Concrete." Place concrete carefully during pours to prevent voids under and between conduits and at exterior surface of envelope. Do not allow a heavy mass of concrete to fall directly onto ducts. Allow concrete to flow to center of bank and rise up in middle, uniformly filling all open spaces. Do not use power-driven agitating equipment unless specifically designed for duct-bank application.

K. Direct-Buried Duct Banks:

1. Excavate trench bottom to provide firm and uniform support for duct bank. Comply with requirements in Section 312000 "Earth Moving" for preparation of trench bottoms for pipes less than 6 inches in nominal diameter.
2. Support ducts on duct separators coordinated with duct size, duct spacing, and outdoor temperature.
3. Space separators close enough to prevent sagging and deforming of ducts, with not less than [**four**] [**five**] spacers per 20 feet of duct. Secure separators to earth and to ducts to prevent displacement during backfill and yet permit linear duct movement due to expansion and contraction as temperature changes. Stagger spacers approximately 6 inches between tiers.
4. Depth: Install top of duct bank at least 36 inches below finished grade unless otherwise indicated.
5. Set elevation of bottom of duct bank below frost line.

6. Install ducts with a minimum of 3 inches between ducts for like services and 6 inches between power and signal ducts.
7. Elbows: Install manufactured duct elbows for stub-ups at poles and equipment, at building entrances through floor, and at changes of direction in duct run unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
8. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment, at building entrances through floor, and at changes of direction in duct run.

    a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete.
    b. For equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.

9. After installing first tier of ducts, backfill and compact. Start at tie-in point and work toward end of duct run, leaving ducts at end of run free to move with expansion and contraction as temperature changes during this process. Repeat procedure after placing each tier. After placing last tier, hand place backfill to 4 inches over ducts and hand tamp. Firmly tamp backfill around ducts to provide maximum supporting strength. Use hand tamper only. After placing controlled backfill over final tier, make final duct connections at end of run and complete backfilling with normal compaction. Comply with requirements in Section 312000 "Earth Moving" for installation of backfill materials.

    a. Place minimum 3 inches of sand as a bed for duct bank. Place sand to a minimum of 6 inches above top level of duct bank.
    b. Place minimum 6 inches of engineered fill above concrete encasement of duct bank.

L. Warning Planks: Bury warning planks approximately 12 inches above direct-buried ducts and duct banks, placing them 24 inches o.c. Align planks along the width and along the centerline of duct bank. Provide an additional plank for each 12-inch increment of duct-bank width over a nominal 18 inches. Space additional planks 12 inches apart, horizontally.

M. Warning Tape: Bury warning tape approximately 12 inches above all concrete-encased ducts and duct banks. Align tape parallel to and within 3 inches of centerline of duct bank. Provide an additional warning tape for each 12-inch increment of duct-bank width over a nominal 18 inches. Space additional tapes 12 inches apart, horizontally.

3.05 INSTALLATION OF CONCRETE MANHOLES, HANDHOLES, AND BOXES

A. Cast-in-Place Manhole Installation:

1. Finish interior surfaces with a smooth-troweled finish.
2. Windows for Future Duct Connections: Form and pour concrete knockout panels 1-1/2 to 2 inches thick, arranged as indicated.
3. Comply with requirements in Section 033000 "Cast-in-Place Concrete" for cast-in-place concrete, formwork, and reinforcement.

B. Precast Concrete Handhole and Manhole Installation:

1. Comply with ASTM C 891 unless otherwise indicated.
2. Install units level and plumb and with orientation and depth coordinated with connecting ducts, to minimize bends and deflections required for proper entrances.
3. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.

C. Elevations:

1. Manhole Roof: Install with rooftop at least 15 inches below finished grade.
2. Manhole Frame: In paved areas and trafficways, set frames flush with finished grade. Set other manhole frames 1 inch above finished grade.
3. Handhole Covers: In paved areas and trafficways, set surface flush with finished grade. Set covers of other handholes 1 inch above finished grade.
4. Where indicated, cast handhole cover frame integrally with handhole structure.

D. Drainage: Install drains in bottom of manholes where indicated. Coordinate with drainage provisions indicated.

E. Manhole Access: Circular opening in manhole roof; sized to match cover size.

1. Manholes with Fixed Ladders: Offset access opening from manhole centerlines to align with ladder.
2. Install chimney, constructed of precast concrete collars and rings, to support cast-iron frame to connect cover with manhole roof opening. Provide moisture-tight masonry joints and waterproof grouting for frame to chimney.

F. Fixed Manhole Ladders: Arrange to provide for safe entry with maximum clearance from cables and other items in manholes.

G. Field-Installed Bolting Anchors in Manholes and Concrete Handholes: Do not drill deeper than 3-7/8 inches for manholes and 2 inches for handholes, for anchor bolts installed in the field. Use a minimum of two anchors for each cable stanchion.

3.06 INSTALLATION OF HANDHOLES AND BOXES OTHER THAN PRECAST CONCRETE

A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting ducts, to minimize bends and deflections required for proper entrances. Use box extension if required to match depths of ducts, and seal joint between box and extension as recommended by manufacturer.

B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.

C. Elevation: In paved areas and trafficways, set cover flush with finished grade. Set covers of other handholes 1 inch above finished grade.

D. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm

lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in enclosure.

E. Field cut openings for ducts and conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

F. For enclosures installed in asphalt paving and subject to occasional, nondeliberate, heavy-vehicle loading, form and pour a concrete ring encircling, and in contact with, enclosure and with top surface screeded to top of box cover frame. Bottom of ring shall rest on compacted earth.

1. Concrete: 3000 psi, 28-day strength, complying with Section 033000 "Cast-in-Place Concrete," with a troweled finish.
2. Dimensions: 10 inches wide by 12 inches deep.

3.07 GROUNDING

A. Ground underground ducts and utility structures according to Section 260526 "Grounding and Bonding for Electrical Systems."

3.08 FIELD QUALITY CONTROL

A. Perform the following tests and inspections and prepare test reports:

1. Demonstrate capability and compliance with requirements on completion of installation of underground ducts and utility structures.
2. Pull solid aluminum or wood test mandrel through duct to prove joint integrity and adequate bend radii, and test for out-of-round duct. Provide a minimum 6-inch-long mandrel equal to 80 percent fill of duct. If obstructions are indicated, remove obstructions and retest.
3. Test manhole and handhole grounding to ensure electrical continuity of grounding and bonding connections. Measure and report ground resistance as specified in Section 260526 "Grounding and Bonding for Electrical Systems."

B. Correct deficiencies and retest as specified above to demonstrate compliance.

3.09 CLEANING

A. Pull leather-washer-type duct cleaner, with graduated washer sizes, through full length of ducts. Follow with rubber duct swab for final cleaning and to assist in spreading lubricant throughout ducts.

B. Clean internal surfaces of manholes, including sump. Remove foreign material.

END OF SECTION

SECTION 26 0553

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Identification for raceways.
2. Identification of power and control cables.
3. Identification for conductors.
4. Underground-line warning tape.
5. Warning labels and signs.
6. Instruction signs.
7. Equipment identification labels.
8. Miscellaneous identification products.

1.02 ACTION SUBMITTALS

A. Product Data: For each electrical identification product indicated.

1.03 QUALITY ASSURANCE

A. Comply with ANSI A13.1.

B. Comply with NFPA 70.

C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.

D. Comply with ANSI Z535.4 for safety signs and labels.

E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

PART 2 - PRODUCTS

2.01 POWER RACEWAY IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.

B. Colors for Raceways Carrying Circuits at 600 V or Less:

1. Black letters on an orange field.

C. Self-Adhesive Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

1. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

2.02 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

1. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

2.03 UNDERGROUND-LINE WARNING TAPE

A. Tape:

1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.
2. Printing on tape shall be permanent and shall not be damaged by burial operations.
3. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.

B. Color and Printing:

1. Comply with ANSI Z535.1 through ANSI Z535.5.
2. Inscriptions for Red-Colored Tapes: ELECTRIC LINE, HIGH VOLTAGE.
3. Inscriptions for Orange-Colored Tapes: TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE.

C. Tag: Type ID:

1. Detectable three-layer laminate, consisting of a printed pigmented polyolefin film, a solid aluminum-foil core, and a clear protective film that allows inspection of the continuity of the conductive core, bright-colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
2. Overall Thickness: 5 mils.
3. Foil Core Thickness: 0.35 mil.
4. Weight: 28 lb/1000 sq. ft..

5. 3-Inch Tensile According to ASTM D 882: 70 lbf, and 4600 psi.

2.04 WARNING LABELS AND SIGNS

A. Comply with NFPA 70 and 29 CFR 1910.145.

B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.

C. Baked-Enamel Warning Signs:

1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
2. 1/4-inch grommets in corners for mounting.
3. Nominal size, 7 by 10 inches.

D. Metal-Backed, Butyrate Warning Signs:

1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for application.
2. 1/4-inch grommets in corners for mounting.
3. Nominal size, 10 by 14 inches.

2.05 INSTRUCTION SIGNS

A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. inches and 1/8 inch thick for larger sizes.

1. Engraved legend with black letters on white face.
2. Punched or drilled for mechanical fasteners.
3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

B. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch.

C. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and UV-resistant seal for label.

2.06 EQUIPMENT IDENTIFICATION LABELS

A. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and UV-resistant seal for label.

B. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch.

C. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch.

2.07 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).

B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

B. Apply identification devices to surfaces that require finish after completing finish work.

C. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

D. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

E. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.

F. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.

3.02 IDENTIFICATION SCHEDULE

A. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.

SECTION 26 0553

IDENTIFICATION FOR ELECTRICAL SYSTEMS

1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded service feeder and branch-circuit conductors.

    a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit.
    b. Colors for 208/120-V Circuits:

        1) Phase A: Black.
        2) Phase B: Red.
        3) Phase C: Blue.

    c. Colors for 480/240-V Circuits:

        1) Phase A: Brown.
        2) Phase B: Orange.
        3) Phase C: Yellow.

    d. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

B. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.

C. Conductors to Be Extended in the Future: Attach write-on tags to conductors and list source.

D. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.

E. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.

1. Limit use of underground-line warning tape to direct-buried cables.
2. Install underground-line warning tape for both direct-buried cables and cables in raceway.

F. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.

G. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.

H. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:
   a. Outdoor Equipment: Engraved, laminated acrylic.
   b. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.

END OF SECTION

SECTION 26 2416

PANELBOARDS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Lighting and appliance branch-circuit panelboards.

1.02 DEFINITIONS

A. MCCB: Molded-case circuit breaker.

B. SPD: Surge protective device.

1.03 ACTION SUBMITTALS

A. Product Data: For each type of panelboard.

B. Shop Drawings: For each panelboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details.
2. Detail enclosure types including mounting and anchorage, environmental protection, knockouts, corner treatments, covers and doors, gaskets, hinges, and locks.
3. Detail bus configuration, current, and voltage ratings.
4. Short-circuit current rating of panelboards and overcurrent protective devices.
5. Include evidence of NRTL listing for SPD as installed in panelboard.
6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
7. Include wiring diagrams for power, signal, and control wiring.
8. Key interlock scheme drawing and sequence of operations.

1.04 INFORMATIONAL SUBMITTALS

A. Panelboard schedules for installation in panelboards.

1.05 **CLOSEOUT SUBMITTALS**

A. Operation and maintenance data.

1.06 FIELD CONDITIONS

A. Service Conditions: NEMA PB 1, usual service conditions, as follows:

1. Ambient temperatures within limits specified.
2. Altitude not exceeding 6600 feet.

1.07 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace panelboards that fail in materials or workmanship within specified warranty period.

1. Panelboard Warranty Period: 18 months from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PANELBOARDS COMMON REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NEMA PB 1.

C. Comply with NFPA 70.

D. Enclosures: Surface-mounted, dead-front cabinets.

1. Rated for environmental conditions at installed location.
2. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box. Trims shall cover all live parts and shall have no exposed hardware.
3. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover. Trims shall cover all live parts and shall have no exposed hardware.

E. Incoming Mains Location: Bottom.

F. Phase, Neutral, and Ground Buses: Hard-drawn copper, 98 percent conductivity.

G. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Material: Tin-aluminum.
2. Main and Neutral Lugs: Mechanical type, with a lug on the neutral bar for each pole in the panelboard.
3. Ground Lugs and Bus-Configured Terminators: Mechanical type, with a lug on the bar for each pole in the panelboard.

H. NRTL Label: Panelboards shall be labeled by an NRTL acceptable to authority having jurisdiction for use as service equipment with one or more main service disconnecting and overcurrent protective devices. Panelboards shall have meter enclosures, wiring, connections,

and other provisions for utility metering. Coordinate with utility company for exact requirements.

I. Future Devices: Panelboards shall have mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.

J. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals. Assembly listed by an NRTL for 100 percent interrupting capacity.

2.02 PERFORMANCE REQUIREMENTS

A. Surge Suppression: Factory installed as an integral part of indicated panelboards, complying with UL 1449 SPD Type 1.

2.03 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Siemens.

B. Square D.

C. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.

D. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

E. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.

2.04 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. Siemens.

B. Square D.

a. Handle Clamp: Loose attachment, for holding circuit-breaker handle in on position.

C. Fused Switch: NEMA KS 1, Type HD; clips to accommodate specified fuses; lockable handle.

1. Fuses and Spare-Fuse Cabinet: Comply with requirements specified in Section 262813 "Fuses."

2.05 IDENTIFICATION

A. Panelboard Label: Manufacturer's name and trademark, voltage, amperage, number of phases, and number of poles shall be located on the interior of the panelboard door.

B. Breaker Labels: Faceplate shall list current rating, UL and IEC certification standards, and AIC rating.

C. Circuit Directory: Directory card inside panelboard door, mounted in metal frame with transparent protective cover.

2.06 ACCESSORY COMPONENTS AND FEATURES

A. Portable Test Set: For testing functions of solid-state trip devices without removing from panelboard. Include relay and meter test plugs suitable for testing panelboard meters and switchboard class relays.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Comply with NECA 1.

B. Install panelboards and accessories according to NECA 407 NEMA PB 1.1.

C. Comply with mounting and anchoring requirements specified in Section 260548.16 "Seismic Controls for Electrical Systems."

D. Mount top of trim 90 inches above finished floor unless otherwise indicated.

E. Mount panelboard cabinet plumb and rigid without distortion of box.

F. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.

G. Install overcurrent protective devices and controllers not already factory installed.

H. Make grounding connections and bond neutral for services and separately derived systems to ground. Make connections to grounding electrodes, separate grounds for isolated ground bars, and connections to separate ground bars.

I. Install filler plates in unused spaces.

J. Arrange conductors in gutters into groups and bundle and wrap with wire ties.

3.02 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; install warning signs complying with requirements in Section 260553 "Identification for Electrical Systems."

B. Create a directory to indicate installed circuit loads; incorporate Owner's final room designations. Obtain approval before installing. Handwritten directories are not acceptable. Install directory inside panelboard door.

C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

D. Device Nameplates: Label each branch circuit device in power panelboards with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

E. Install warning signs complying with requirements in Section 260553 "Identification for Electrical Systems" identifying source of remote circuit.

3.03 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Acceptance Testing Preparation:

1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

C. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test for low-voltage air circuit breakers stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

D. Panelboards will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results, with comparisons of the two scans. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

END OF SECTION

SECTION 26 2726
WIRING DEVICES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Receptacles, receptacles with integral GFCI, and associated device plates.
2. Weather-resistant receptacles.

1.02 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Receptacles for Owner-Furnished Equipment: Match plug configurations.

1.03 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

1.04 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.05 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Leviton.

B. Legrand.

C. Hubbell.

D. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

SECTION 26 2726
WIRING DEVICES

2.02 GENERAL WIRING-DEVICE REQUIREMENTS

A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NFPA 70.

C. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions:

1. Connectors shall comply with UL 2459 and shall be made with stranding building wire.
2. Devices shall comply with the requirements in this Section.

2.03 GFCI RECEPTACLES

A. General Description:

1. Straight blade.
2. Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 943 Class A, and FS W-C-596.
3. Include indicator light that shows when the GFCI has malfunctioned and no longer provides proper GFCI protection.

B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:

C. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant, die-cast aluminum with lockable cover.

2.04 FINISHES

A. Device Color:

1. Wiring Devices Connected to Normal Power System: White unless otherwise indicated or required by NFPA 70 or device listing.

2.05 INSTALLATION

A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.

B. Conductors:

1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
4. Existing Conductors:

a. Cut back and pigtail, or replace all damaged conductors.
b. Straighten conductors that remain and remove corrosion and foreign matter.
c. Pigtailing existing conductors is permitted, provided the outlet box is large enough.

C. Device Installation:

1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

D. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles down.

E. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

F. Adjust locations of service poles to suit arrangement of partitions and furnishings.

2.06 GFCI RECEPTACLES

A. Install non-feed-through-type GFCI receptacles.

2.07 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Test Instruments: Use instruments that comply with UL 1436.
2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.

B. Tests for Convenience Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.
2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
3. Ground Impedance: Values of up to 2 ohms are acceptable.
4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.

5. Using the test plug, verify that the device and its outlet box are securely mounted.
6. Tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.

C. Wiring device will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

END OF SECTION

SECTION 26 2816

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Fusible switches.
2. Nonfusible switches.
3. Receptacle switches.
4. Shunt trip switches.
5. Molded-case circuit breakers (MCCBs).
6. Enclosures.

1.02 DEFINITIONS

A. NC: Normally closed.

B. NO: Normally open.

C. SPDT: Single pole, double throw.

1.03 PERFORMANCE REQUIREMENTS

1.04 ACTION SUBMITTALS

A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated.

B. Shop Drawings: For enclosed switches and circuit breakers. Include plans, elevations, sections, details, and attachments to other work.

1. Wiring Diagrams: For power, signal, and control wiring.

1.05 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.06 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

SECTION 26 2816

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

1.07 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.01 FUSIBLE SWITCHES

A. Siemens, GE, Square D

B. Type HD, Heavy Duty, Single Throw, 240-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
4. Lugs: Suitable for number, size, and conductor material.
5. Service-Rated Switches: Labeled for use as service equipment.

2.02 NONFUSIBLE SWITCHES

A. Type HD, Heavy Duty, Single Throw, 240-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

B. Type HD, Heavy Duty, Double Throw, 240-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Lugs: Suitable for number, size, and conductor material.

2.03 SHUNT TRIP SWITCHES

A. General Requirements: Comply with ASME A17.1, UL 50, and UL 98, with 200-kA interrupting and short-circuit current rating when fitted with Class J fuses.

B. Switches: Three-pole, horsepower rated, with integral shunt trip mechanism and Class J fuse block; lockable handle with capability to accept three padlocks; interlocked with cover in closed position.

C. Control Circuit: 120-V ac; obtained from integral control power transformer, with primary and secondary fuses, with a control power source of enough capacity to operate shunt trip, connected pilot, and indicating and control devices.

D. Accessories:

1. Oiltight key switch for key-to-test function.
2. Oiltight ON pilot light.
3. Isolated neutral lug.
4. Mechanically interlocked auxiliary contacts that change state when switch is opened and closed.
5. Form C alarm contacts that change state when switch is tripped.
6. Three-pole, double-throw, fire-safety and alarm relay; 24-V dc coil voltage.
7. Three-pole, double-throw, fire-alarm voltage monitoring relay complying with NFPA 72.

2.04 MOLDED-CASE CIRCUIT BREAKERS

A. General Requirements: Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.

B. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

C. Electronic Trip Circuit Breakers: Field-replaceable rating plug, rms sensing, with the following field-adjustable settings:

1. Instantaneous trip.
2. Long- and short-time pickup levels.
3. Long- and short-time time adjustments.
4. Ground-fault pickup level, time delay, and I^2t response.

D. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller, and let-through ratings less than NEMA FU 1, RK-5.

E. Features and Accessories:

1. Standard frame sizes, trip ratings, and number of poles.
2. Lugs: Suitable for number, size, trip ratings, and conductor material.

3. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge lighting circuits.
4. Ground-Fault Protection: Comply with UL 1053; integrally mounted, self-powered type with mechanical ground-fault indicator; relay with adjustable pickup and time-delay settings, push-to-test feature, internal memory, and shunt trip unit; and three-phase, zero-sequence current transformer/sensor.
5. Shunt Trip: Trip coil energized from separate circuit, with coil-clearing contact.
6. Auxiliary Contacts: Two SPDT switches with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts, "b" contacts operate in reverse of circuit-breaker contacts.
7. Alarm Switch: One NO contact that operates only when circuit breaker has tripped.

2.05 ENCLOSURES

A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.

1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
2. Outdoor Locations: NEMA 250, Type 3R.
3. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4.
4. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 12.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.

B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

C. Install fuses in fusible devices.

D. Comply with NECA 1.

3.02 IDENTIFICATION

A. Comply with requirements in Section 260553 "Identification for Electrical Systems."

1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.03 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Acceptance Testing Preparation:

1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

C. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

D. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports, including a certified report that identifies enclosed switches and circuit breakers and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

END OF SECTION

SECTION 26 4113
LIGHTNING PROTECTION FOR STRUCTURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. General: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work specified of this section.

1.02 DESCRIPTION

A. General: Provide a complete lightning protection system as indicated on the drawings and as specified herein. The lightning protection system shall be installed by a firm presently engaged in installations of Master Labeled or LPI certified lightning protection systems. The system as completed shall comply with the latest edition of UL96A, Installation Requirements for Lightning Protection Systems, and NFPA-780 "Standard for the Installation of Lightning Protection Systems." The system shall meet all requirements of these standards and the Lightning Protection Institute Standard of Practice LPI-175. All components required for a UL master label and a full LPI certification plate shall be provided whether or not such materials are specifically addressed by the contract drawings or described herein.

B. Qualification: All installers shall be experienced with installing UL master labeled and LPI certified systems or of equivalent qualification, as accepted in writing by the engineer of record. A UL/LPI certified installer shall be on the project site at all times during installation of the systems and shall supervise all of the installation.

1.03 COUNTERPOISE CONDUCTOR

A. General: Where indicated on the drawings or required by NFPA 780, the structure shall be provided with a below-grade continuous counterpoise conductor, equal in size to the largest conductor in the building lightning protection system, or sized as indicated on the drawing. This conductor shall be installed at a minimum depth of two feet below finished grade and a minimum of two feet from the exterior foundation wall of the building. The counterpoise conductor shall be copper and extend continuously around the entire perimeter of the building. All joints and connections shall be exothermically welded.

B. Counterpoise: As a minimum, the counterpoise conductor shall be connected to each of the following system components utilizing appropriate exothermic welds:

1. Each down conductor or steel column ground.

2. All counterpoise conductors on power and communications ducts which enter the building.

3. The building electrical service ground.

4. All metallic water and gas services entering the building (ahead of meter).

5. Counterpoise conductor on adjacent buildings (within fifty feet).

6. All metallic fence posts, safety railings, etc., or any other metallic item within ten feet of the project building.

1.04 SUBMITTALS

A. General: Shop drawings identifying all system wiring and component placement, including all details, shall be submitted to the Engineer for review. The Contractor shall not perform any portion of the Work until the respective submittal has been accepted. All work shall be in accordance with accepted submittals.

B. Detail Submission: Details shall be submitted to the Engineer for review indicating the method of cabling connections and attachments starting at the top of the project building to the ground rods at the counterpoise. All details shall be appropriate for the project.

C. Identification: All product data sheets submitted, for proposed system components, shall clearly identify the item being submitted and shall indicate the UL label.

D. Suppression Device: All transient voltage surge suppressors for the project shall be submitted at the same time as the lightning protection floor plans, details and product data sheets are submitted. Each suppressor shall clearly indicate the item to be protected and shall comply with Section 16709 of these specifications. Suppressors shall be provided as required in NFPA 780 unless otherwise indicated on the drawings or otherwise specified.

E. Deviations: The Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the acceptance of shop drawings, product data, samples or similar submittals unless the Contractor has specifically informed the Engineer in writing of such deviation at the time of submittal and the Engineer has given written acceptance to the specific deviation.

F. Certification: Provide documentation of UL master label, LPI certification or equivalent qualification of exact installer intended to do this particular job.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Labels: All materials used for the system installation shall comply in size, composition and weight to all requirements of NFPA U.L. and LPI for the class of system in which they are installed. All materials shall be labeled or listed by Underwriters Laboratories, Inc. for use in master labeled or LPI certified lightning protection systems.

B. Material: Generally, the external lightning protection system at the roof level shall be constructed of copper cable and copper compatible components. The internal lightning protection system, starting with the down conductors and concluding at the ground termination system shall be constructed of copper cable and copper compatible components. Likewise, all bonding conductors, equipotential loop conductors, etc, shall also be constructed of compatible cable and components.

C. Compatibility: All portions of the system, whether copper or aluminum, shall be galvanically compatible to the building material to which they are to be attached. Connections between copper and aluminum portions of the system shall be made with appropriate bimetallic coupling devices. In all areas, the conductor shall be supported to maintain clearance from all galvanically incompatible materials or shall be of the same material if permitted within these specifications.

D. Components: All system components (i.e. air terminals, bases, connectors, cable, thru-roof fittings, ground rods, etc.) shall be, to the maximum extent possible, the product of a single

manufacturer. All components shall be Class I or II as required by NFPA 780 or as noted. All air terminal bases shall be securely mounted to the building structure by means of mechanical fasteners. Adhesive type air terminal bases are acceptable only where hard setting epoxy adhesive is utilized, where mechanical fastening is prohibited by the roofing manufacturer and where acceptable to the code authority having jurisdiction. Submit shop drawings for all proposed air terminal mounting details.

2.02 AIR TERMINALS

A. General: Air Terminals shall be copper as required to match the building system to which they attach. Air terminals shall protrude a minimum of 10 inches above the object to be protected. Center roof terminals shall be 24" high. Air terminal points shall be blunt with the radius of curvature equal to the rod diameter.

B. Base: Each air terminal shall be equipped with the correct type of base for the location in which it is mounted.

C. Roof Top Equipment: Air terminals and interconnecting cable shall be provided for all roof mounted equipment (fans, A/C equipment, etc.) subject to a direct strike as required by NFPA 780 and as shown.

2.03 CONDUCTORS

A. General: Main roof conductors shall be copper unless otherwise specified or required and shall provide a two-way path from each air terminal horizontally or downward to connections with down conductors. Conductors shall be free of excessive splices and bends. No bend of a conductor shall form an included angle of less than 90 degrees nor have a radius of bend of less than 8 inches. Conductors shall be secured to the structure at intervals not exceeding 3 feet with approved fasteners. Cables connected to "thru-roof" connectors may rise from the roof to the connector at a maximum slope of 3 inches per foot, not exceeding 3 feet horizontally in air.

B. Down Conductors: Down conductors shall be copper and shall be concealed in the exterior wall construction or structural columns. Where run in or on reinforced concrete columns, bond down conductor to the re-bar at top and bottom of column. Down conductors shall be spaced at intervals averaging not more than 100 feet around the perimeter of the structure. If project structure is of structural steel frame construction, down conductors may be omitted and roof conductors shall be connected to the structural steel frame at intervals averaging not more than 100 feet around the perimeter of the structure. Connections to the steel frame shall be made with heavy duty bonding plates having 8 square inches of contact surface or with exothermic welds.

C. Shop Drawing: Submit all conductor types in shop drawings. Each conductor shall be identified as to location in the lightning protection system.

2.04 ROOF PENETRATIONS

A. General: Roof penetrations required for down conductors or for connections to structural steel framework shall be made using pre-manufactured U.L. approved thru-roof type assemblies with solid rods, PVC sleeves and appropriate roof flashing. Roof flashing shall be compatible with the roofing system and shall be provided under this contract and installed by the roofing contractor. Submit roof flashing data sheets and letter of acceptance from roofing contractor in shop drawing package.

2.05 COMMON GROUNDING

A. General: Common grounding of all ground mediums within the project building shall be made by interconnecting with main size conductors, fittings as required or exothermic welds.

B. Bonding: Grounded metal bodies located within the required bonding distance (as determined by the bonding distance formulas in NFPA 780) shall be bonded to the system using bonding conductors and fittings. Bond to rebar utilizing mechanical connections.

2.06 GROUND TERMINATIONS

A. General: One ground termination shall be provided for each down conductor and shall consist of one ¾" inch x 10 foot copper-clad ground rod. Each down conductor shall be connected to the ground rod by an exothermic weld connection. Tops of ground rods shall be located 2 feet below finished grade and 2 feet from the foundation wall and shall extend a minimum of 10 feet vertically into the earth. Where a counterpoise is provided, rods shall be interconnected with the counterpoise.

B. General: Where the structural steel framework is utilized as the down conductor for the system, every other perimeter steel column shall be grounded but no more than 60 feet apart. Steel columns shall be grounded using bonding plates having 8 square inches of surface contact area or with exothermic welds. Conductors from the steel column connections to the ground terminations shall be full size copper lightning conductors.

2.07 FASTENERS

A. General: Conductor fasteners shall be manufactured of a material which is compatible with the type of conductor being supported. Fasteners shall be of sufficient strength to properly support each conductor or terminal base, etc.

2.08 ACCEPTABLE MANUFACTURERS

A. Manufacturers: Equipment manufactured by ERICO, INC.

B. Certified Installer: BONDED LIGHTNING PROTECTION SYSTEMS, INC.
2080 W. INDIANTOWN ROAD, SUITE 100
JUPITER, FL 33458 561/746-4336

C. Approved Equal

PART 3 - EXECUTION

3.01 INSTALLATION OF CONDUCTORS

A. General: Conductors shall be installed to interconnect all air terminals to the system of grounding electrodes, and in general provide a minimum of at least 2 paths to ground from any air terminal on the system. Conductors shall provide a horizontal or downward path between the system air terminals and grounding electrode system.

B. Routing: Conductors shall be routed in such a manner that maximum concealment from public view is achieved. Down conductors may be installed in one-inch PVC conduit from roof to grade.

C. Counterpoise Conductors: Counterpoise conductors shall be installed after finished grades are established to insure specified depth and to minimize the possibility of damage. Any counterpoise conductor which is cut or damaged shall be repaired or replaced with no additional cost to the contract.

D. Connections: All connections between conductors below grade shall be exothermically welded. Improper application of weld shall be replaced at no additional cost to the contract.

3.02 INSTALLATION OF GROUND RODS

A. General: Ground rods shall be installed vertically at each down conductor position at a minimum of 2 feet from the building foundation wall. Inspection and documentation at each grounded location, weld, depth of counterpoise, etc., shall be made prior to backfill. Contractor shall notify engineer in writing to request inspection of underground work and for L.P.I. inspection before backfill. Allow a minimum of one week for engineer to make the inspection after notification from contractor.

3.03 BONDING **OF** SECONDARY METALLIC BODIES

A. Structure Grounding: Provision shall be made at the roof level on reinforced concrete structures for bonding between the roof or down conductors, metallic elements of the roof system and metallic exterior wall systems.

B. Bonding: All down conductors run in concrete columns shall be bonded to the reinforcing steel at the top and the bottom of the column.

3.04 GENERAL WORKMANSHIP

A. General: All elements of the Lightning Protection System shall be installed in a professional and workmanlike manner consistent with the best industry practices.

B. Concealed Installation: All system components shall be concealed to the maximum extent possible to preserve the aesthetic appearance of the project building on which the system is installed.

3.05 COORDINATION WITH OTHER TRADES

A. Coordination: The Contractor shall coordinate his work with all trades, to insure the use of proper materials and procedures in and around the roof in order not to jeopardize the roofing warranty.

B. Fasteners: Where fasteners are to be embedded in masonry or the structural system, they shall be coordinated to insure installation at the proper time of construction.

C. Certification: Upon completion of the installation the Contractor shall provide to the owner the Master Label issued by Underwriters Laboratories, Inc. for the installation, and the LPI certification issued by LPI.

END OF SECTION

PART 6

DRAWINGS

SMATHERS BEACH

BATHROOM BUILDING PROJECT

PROJECT # 16043

ITB # 17-018

Key West, Florida

BID SET

May 1, 2017

PERMIT

ARCHITECT:

BERMELLO AJAMIL & PARTNERS, INC.

2601 SOUTH BAYSHORE DRIVE 10TH FLOOR
MIAMI, FLORIDA 33133 (305) 859-7835 FAX (305) 859-9638

STRUCTURAL ENGINEER:

DDA ENGINEERS, P.A.

4930 S.W. 74TH COURT
MIAMI, FLORIDA 33155 (305) 666-0711

CIVIL ENGINEER:

PEREZ ENGINEER & DEVELOPMENT, INC.

1010 KENNEDY DRIVE, SUITE 201
KEY WEST, FLORIDA 33040 (305) 293-9440 FAX (305) 296-0243

ELECTRICAL & FIRE PROTECTION ENGINEER:

HNGS ASSOCIATES, INC.

4800 SW 74TH COURT
MIAMI, FLORIDA 33155 (305) 270-9935

LANDSCAPE ARCHITECT:

BERMELLO AJAMIL & PARTNERS, INC.

2601 SOUTH BAYSHORE DRIVE 10TH FLOOR
MIAMI, FLORIDA 33133 (305) 859-7835 FAX (305) 859-9638

OWNER:

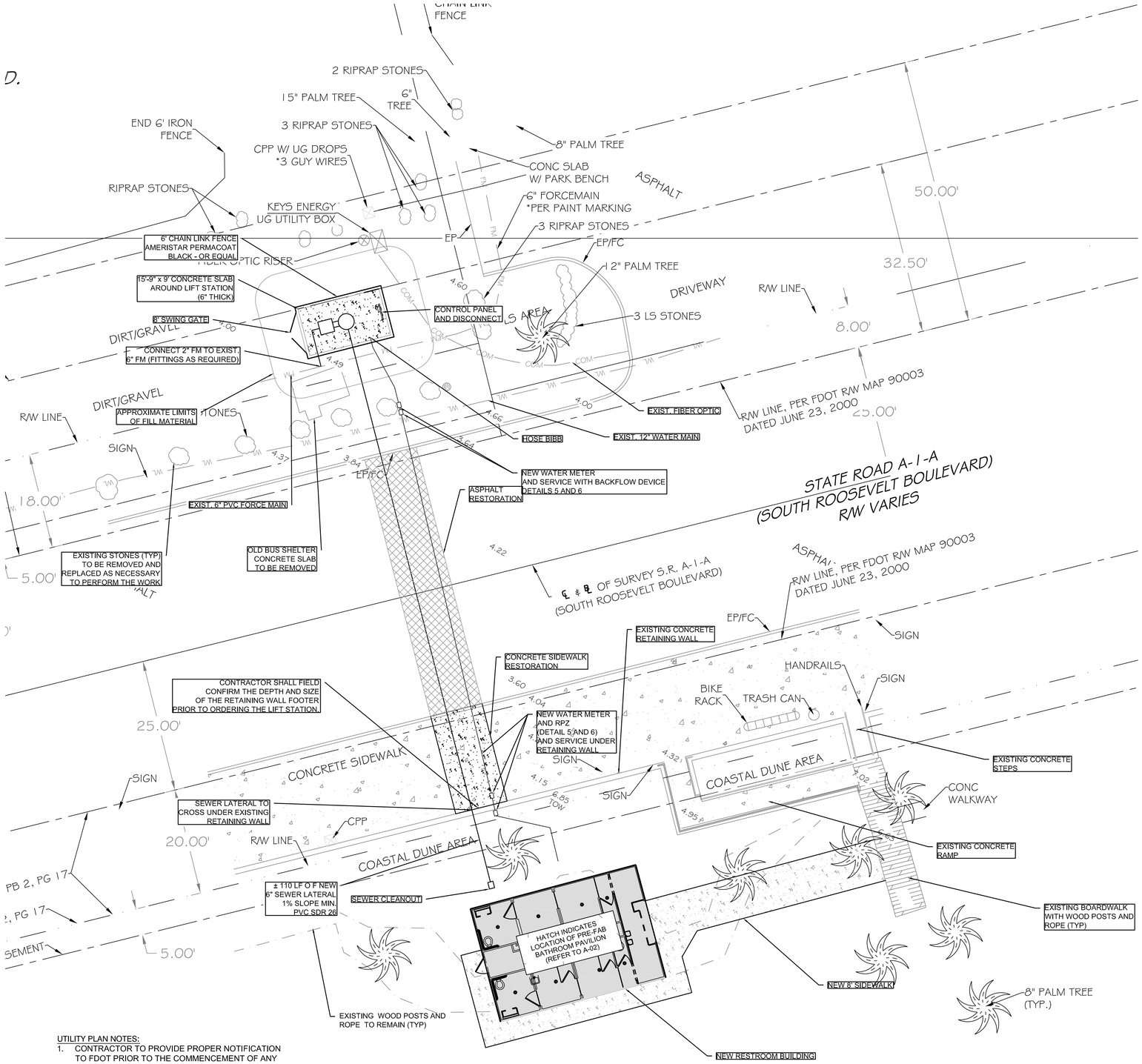
CITY OF KEY WEST

P.O. BOX 1409
3140 FLAGLER AVENUE, KEY WEST FLORIDA 33041

INDEX OF DRAWING

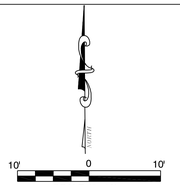
Sheet Number	Sheet Name	BID 05/1/2017
GENERAL		
G000	COVER SHEET	•
CIVIL		
C-01	SITE / UTILITY PLAN	•
C-02	LIFT STATION DETAILS	•
C-03	DETAILS	•
C-04	FDOT GENERAL NOTES AND SECTION	•
C-05	FDOT MOT PLAN	•
C-06	FDOT MOT PLAN	•
ARCHITECTURE		
A-01	ARCHITECTURAL SITE PLAN	•
A-02	PRE-FAB BATHROOM AND DETAIL	•
STRUCTURE		
S-1.01	BATHROOM FOUNDATION AND GROUND FLOOR PLAN AND ROOF FRAMING PLAN	•
S-2.01	GENERAL STRUCTURAL NOTES	•
ELECTRICAL		
E-00	GENERAL NOTES, LEGEND & DETAILS	•
E-01	PRE-FAB BATHROOM SITE PLAN & RISER DIAGRAM	•
E-02	LIGHTING PROTECTION SHEET	•

5/3/17



UTILITY PLAN NOTES:

1. CONTRACTOR TO PROVIDE PROPER NOTIFICATION TO FDOT PRIOR TO THE COMMENCEMENT OF ANY WORK IN THE FDOT R/W
2. ALL AREAS DISTURBED WITIHIN THE FDOT R/W SHALL BE SODDED OR REPLACED IN ACCORDANCE WITH ALL APPLICABLE FDOT STANDARDS AND SPECIFICATIONS.
3. TRENCHING ACROSS SOUTH ROOSEVELT TO BE PERFORMED AT NIGHT IF APPROVED BY FDOT.
4. CONTRACTOR SHALL AN MOT PLAN TO SUPPORT THE FDOT PERMIT.



BAR IS TWO INCHES ON ORIGINAL DRAWINGS IF NOT TWO INCHES ON THIS SHEET ADJUST SCALES ACCORDINGLY

GENERAL NOTES

1. THE CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS AND ADVISE THE ENGINEER OF ANY CONFLICTS OF REPRESENTATION BETWEEN DRAWINGS AND/OR SPECIFICATIONS PRIOR TO COMMENCING WITH CONSTRUCTION.
2. THE CONTRACTOR SHALL FIELD-VERIFY EXISTING CONDITIONS PRIOR TO PERFORMING ANY WORK UNDER THIS CONTRACT AND NOTIFY THE ENGINEER IN WRITING OF ANY DIFFERENCES BEFORE COMMENCING WITH ANY CONSTRUCTION.
3. HORIZONTAL COORDINATES ARE BASED ON FLORIDA STATE PLANE COORDINATE SYSTEM. VERTICAL ELEVATIONS ARE BASED ON NGVD 1929 DATUM.
4. THE LOCATIONS, SIZES, AND ELEVATIONS OF EXISTING UTILITIES AS SHOWN ARE APPROXIMATE. THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER TO OBTAIN ANY AVAILABLE RECORD DRAWINGS AND SHALL DETERMINE THE EXACT LOCATION AND ELEVATION IN THE FIELD. THE CONTRACTOR SHALL ANTICIPATE THAT SCANNING AND EXCAVATION USING LIGHT EQUIPMENT AND HAND METHODS WILL BE NECESSARY IN AREAS NEAR EXISTING UTILITIES AND STRUCTURES TO AVOID DAMAGING THESE FACILITIES. THE CONTRACTOR SHALL CONTACT BELLSOUTH, THE LOCAL TELEPHONE COMPANY AND COMCAST, THE LOCAL CABLE TV PROVIDER TO VERIFY THE LOCATION OF BURIED TELEPHONE AND CABLE TV UTILITIES. NONE HAVE BEEN INDICATED ON THE DRAWINGS. CALL 1-800-432-4770 BEFORE DIGGING OR TRENCHING OPERATIONS BEGIN. CONTRACTOR SHALL ALSO CONTACT KEYS ENERGY TO LOCATE SECONDARY ELECTRIC LINES.
5. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION AND ELEVATION IN THE FIELD PRIOR TO INSTALLING ANY NEW WORK THAT CROSSES OR CONNECTS TO EXISTING UTILITY SYSTEMS. LOCATIONS OF NEW UTILITIES SHALL BE ADJUSTED IN A MANNER APPROVED BY THE ENGINEER TO AVOID CONFLICTS. DAMAGES TO UTILITIES RESULTING FROM THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED BY THE CONTRACTOR AT NO COST TO THE CLIENT.
6. ALL EXCAVATION, TRENCHING, SHEETING, SHORING AND BRACING SHALL BE INSTALLED AS REQUIRED IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS, INCLUDING OSHA (29 CFR 1926).
7. ALL ITEMS INDICATED TO BE REMOVED OR DEMOLISHED SHALL BE REVIEWED WITH THE OWNER TO DETERMINE IF THE ITEM IS TO BE PROPERTY OF THE CONTRACTOR. ALL ITMES SHALL BE REMOVED AND DISPOSED OF IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS, UNLESS OTHERWISE NOTED. NO SALVAGE VALUE IS EXPRESSED OR IMPLIED BY THESE CONTRACT DOCUMENTS FOR ANY ITEMS TO BE REMOVED OR DEMOLISHED.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SECURITY OF THE CONTRACTOR'S EQUIPMENT, MATERIALS, AND PERSONNEL, AND SHALL PROVIDE ADEQUATE BARRIERS TO PREVENT RISK TO OTHERS FROM THE CONTRACTOR'S ACTIVITIES.
9. WHERE ACTUAL DIMENSIONS AND SIZES ARE PROVIDED IN THE DRAWINGS, THEY SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONS. LARGE SCALE DRAWINGS SHALL TAKE PRECEDENCE OVER SMALL SCALE DRAWINGS.
10. THE CONTRACTOR SHALL SEQUENCE HIS OPERATIONS SUCH THAT ORANGE MESH SAFETY FENCING IS PROVIDED ALONG ALL AREAS BEING TRENCHED AND NO TRENCH IS LEFT OPEN AT THE END OF THE WORK DAY.
11. NO CONNECTIONS FOR THE PURPOSE OF OBTAINING WATER SUPPLY DURING CONSTRUCTION SHALL BE MADE TO ANY FIRE HYDRANT OR BLOW-OFF STRUCTURE WITH OUT FIRST OBTAINING A CONSTRUCTION METER FROM THE FLORIDA KEYS AQUEDUCT AUTHORITY.
12. IF UNSATISFACTORY MATERIAL FOR ADEQUATE BEARING IS ENCOUNTERED AT THE NORMAL SUBGRADE, THE UNSATISFACTORY MATERIAL SHALL BE REMOVED AND REPLACED WITH SUITABLE FOUNDATION STABILIZATION MATERIAL AS SPECIFIED. REMOVE SOILS AND OTHER MATERIALS THAT ARE NOT SUITABLE MATERIALS FOR TRENCH BOTTOM TO SIX INCHES UNDER PIPE, MINIMUM.

    REMOVE WET, YIELDING, OR MUCKY SOILS. REMOVE THE FOLLOWING SOILS:
    a. TYPE CH AND TYPE MH CLASS IV SOILS.
    b. ALL CLASS V SOILS.

    REMOVE ORGANIC MATERIAL INCLUDING ROOTS, MULCH, OR OTHER VEGETABLE MATTER, WHICH IN THE OPINION OF THE ENGINEER, WILL RESULT IN UNSATISFACTORY FOUNDATION CONDITIONS.

    REMOVE SOILS CONTAINING COBBLES, BOULDERS OR STONES LARGER THAN ONE AND ONE-HALF INCHES (1-1/2") IN DIAMETER.

    REMOVE LEDGE ROCK AND HARDPAN. REMOVE ROCK AND HARDPAN TO PROVIDE BEDDING WIDTH 24 INCHES WIDER THAN PIPE.

    REMOVE SOILS CONTAINING RUBBISH, TRASH, OR OTHER FOREIGN MATERIALS.
13. IN GENERAL, EXISTING STRUCTURES AND UTILITIES ARE NOTED AS EXISTING AND/OR SHOWN IN LIGHT LINE WEIGHT. NEW CONSTRUCTION IS SHOWN IN HEAVY LINE WEIGHT.
14. ALL FIELD LAYOUT AND SURVEYING FOR CONSTRUCTION OF THIS PROJECT SHALL BE PROVIDED BY THE CONTRACTOR AT HIS EXPENSE, UNDER THE DIRECTION OF A FLORIDA LICENSED PROFESSIONAL LAND SURVEYOR.

BERMELLO AJAMIL & PARTNERS INC

Architecture • Engineering • Planning
Interior Design • Landscape Architecture
2601 South Bayshore Drive
Suite 1000
Miami, Florida 33133
(305) 859-2050
Fax (305) 860-3700

PREPARED FOR/OWNER:
CITY OF KEY WEST, FL
P. O. BOX 1409
3140 FLAGLER AVENUE
KEY WEST, FL 33041

PROJECT NAME:
SMATHERS BEACH RESTROOM

PROJECT LOCATION/ADDRESS:
SOUTH ROOSEVELT BLVD.
KEY WEST, FL 33040

SUB-CONSULTANT INFORMATION:
PEREZ ENGINEERING & DEVELOPMENT, INC.
Certificate of Authorization No. 8579

1010 Kennedy Drive
Suite 201
Key West, Florida 33040
(305) 293-9440
Fax (305) 296-0243

PROFESSIONAL SEAL:

ALLEN E. PEREZ P.E. No. 51468 STATE OF FLORIDA PROFESSIONAL ENGINEER

ALLEN E. PEREZ, P.E. **May 1, 2017**
FLORIDA 51468

SUBMITTAL DESCRIPTION / MILESTONE:

BID SET
May 1, 2017

REVISIONS:

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DRAWING SHEET INFORMATION

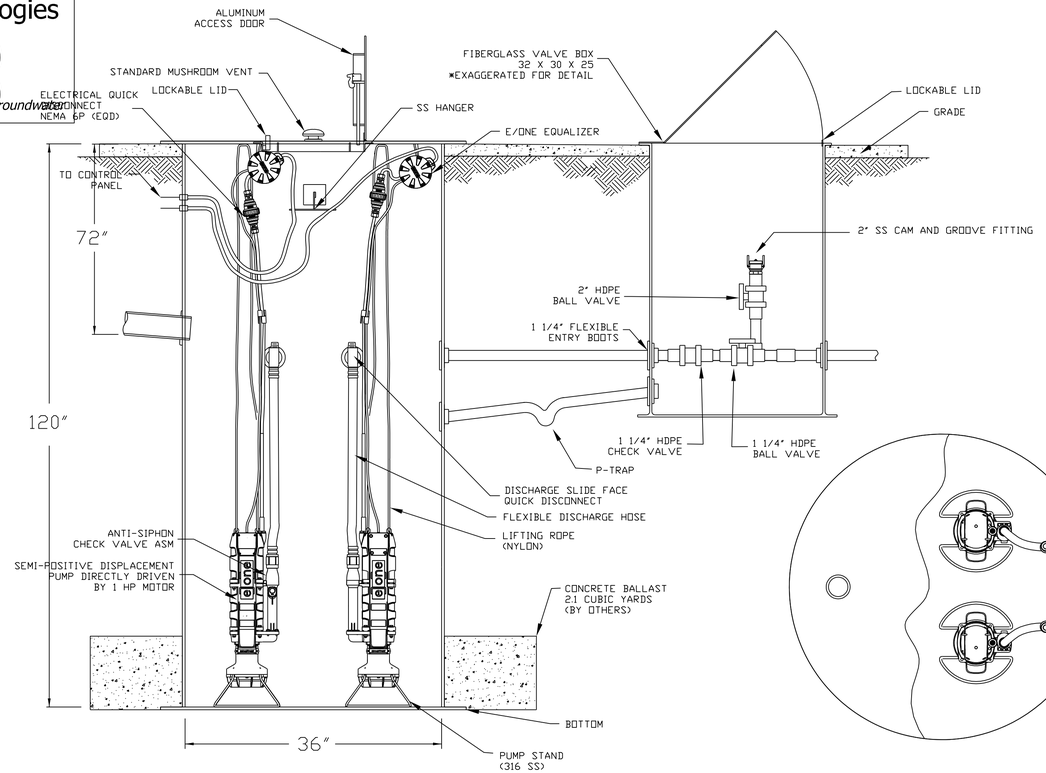
BA PROJECT NO.:	XXXX
SCALE:	AS NOTED
DATE:	June 10, 2016
DRAWN BY:	UT
CHECKED BY:	TO

DRAWING TITLE:
SITE /UTILITY PLAN

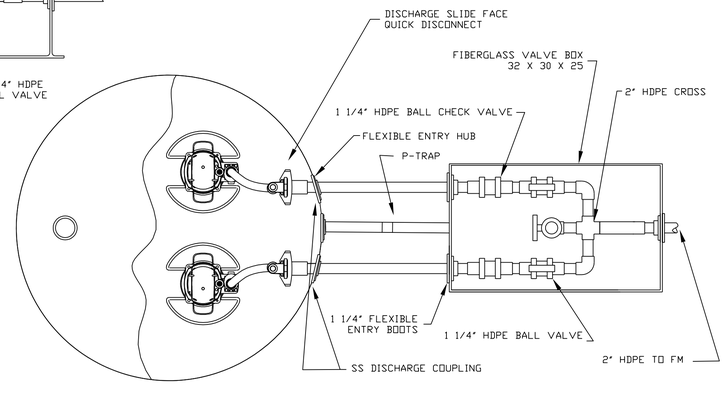
SHEET NO.
C-01

Water ReSource Technologies

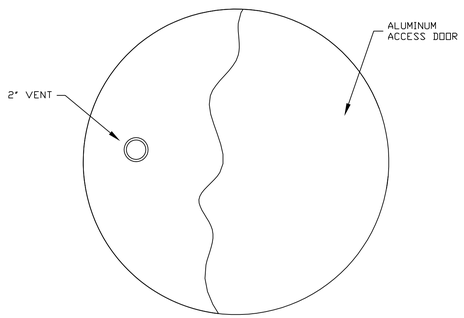
Protecting Our Groundwater



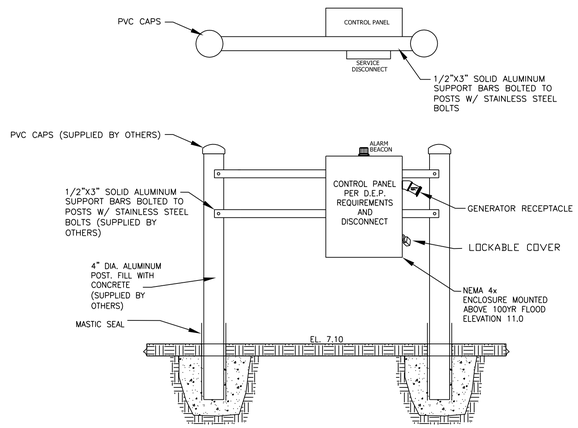
1 Lift Station Section Detail (View Exagerated for Detail)
NTS



2 Lift Station Plan View (View Exagerated for Detail)
NTS



3 Plan View Aluminum Cover
NTS



4 Control Panel Layout
NTS

WRT LIFT STATION SCHEDULE

A	GRADE (TOP)	7.10
B	BOTTOM	(−)2.90
C	INVERT ELEV.	(−)1.00
D	LEAD PUMP ON	(−)1.20
E	LAG PUMP ON	(−)1.60
F	BOTH PUMPS OFF	(−)1.95
H	INLET SIZE	☐ 4" ☒ 6" ☐ 8" ☐ OTHER _____
I	INLET TYPE	☐ SCH-40 ☒ SDR-35
J	VALVE BOX	☒ YES ☐ NO
K	VALVE BOX PIPE	☒ SCH-40 ☐ SCH-80 ☐ HDPE SDR11
L	VENT TYPE	☒ STANDARD MUSHROOM VENT ☐ WRT VENT / CHECK ☐ WRT ODOR VENT

WRT LIFT STATION SIZE CHART

DIAMETER (A)	HEIGHT (B)	COVER OVER DISCHARGE (C)
☐ 36"	☐ 84"	☐ 12"
☐ 48"	☐ 102"	☐ 18"
☐ 60"	☐ 108"	☐ 24"
☐ 72"	☐ 114"	☐ 30"
☒ OTHER 36"	☒ 120"	☒ 36"
	☐ 126"	☐ 48"
	☐ 132"	☐ OTHER _____
	☐ 138"	BY ENGINEER OR CONTRACTOR
	☐ 144"	
	☐ OTHER _____	

WRT PANEL / CONTROL OPTIONS

STANDARD COMPONENTS

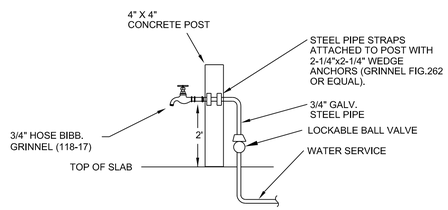
1 NEMA 4X ENCLOSURE ☒ FIBERGLASS (standard) ☐ S.S. ENCLOSURE (upgrade)
2 FLORIDA D.E.P. COMPLIANT ☒
3
4
5

ADDITIONAL OPTIONS

☐ HIGH TIDE SATELLITE SCADA SYSTEM
_____ # OF DIGITAL INPUTS
_____ # OF ANALOG INPUTS ☐ NEMA 4X ENCLOSURE

WRT PUMP STATION COMPLIANCE NOTES

WRT WET WELL DUPLEX IS SUPPLIED WITH E|ONE EXTREME U-SERIES 1HP, 240V, SINGLE PHASE GRINDER PUMPS. EACH PUMP INCLUDES CHECK VALVE, ANTI-SIPHON VALVE AND INTEGRAL CONTROLS.



WATER SERVICE DETAIL
NOT TO SCALE

BERMELLO AJAMIL & PARTNERS INC

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Interior Design • Landscape Architecture
2601 South Bayshore Drive
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PREPARED FOR/OWNER:
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KEY WEST, FL 33041

PROJECT NAME:
SMATHERS BEACH RESTROOM

PROJECT LOCATION/ADDRESS:
SOUTH ROOSEVELT BLVD.
KEY WEST, FL 33040

SUB-CONSULTANT INFORMATION:
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ALLEN E. PEREZ, P.E. May 1, 2017
FLORIDA 51468

SUBMITTAL DESCRIPTION / MILESTONE:

BID SET
May 1, 2017

REVISIONS:

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DRAWING SHEET INFORMATION

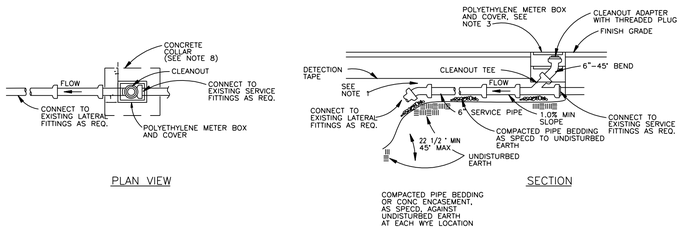
BA PROJECT NO.:	XXXX
SCALE:	AS NOTED
DATE:	June 10, 2016
DRAWN BY:	UT
CHECKED BY:	TO

DRAWING TITLE:
LIFT STATION DETAILS

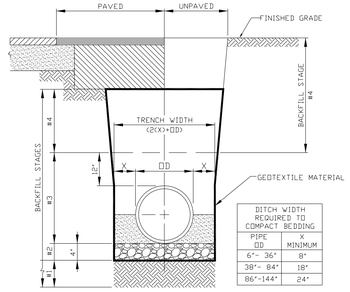
SHEET NO.
C-02

NOTES:

1. CONTRACTOR SHALL PROVIDE AN ADEQUATE SUPPLY OF 22 1/2°, 45° AND 6° WYES BENDS TO MEET VARYING FIELD CONDITIONS.
2. LENGTH OF SERVICE PIPE VARIES AT EACH SERVICE CONNECTION AND SHALL BE PROVIDED AS REQUIRED TERMINATE SERVICE AT LOCATION DIRECTED BY THE ENGINEER.
3. INSTALL MULTIPLE METER BOXES AS REQUIRED TO BRING TO GRADE.
4. IF SERVICE PIPE MATERIAL IS NOT THE SAME AS SEWER MAIN, CONNECTION SHALL BE APPROVED PRIOR TO CONSTRUCTION.
5. CONNECT AT TRENCH WALL OR AT SERVICE CONNECTION AT SEWER MAIN, AS DIRECTED BY THE ENGINEER.
6. WHERE ADEQUATE SEPARATION BETWEEN WATER MAIN AND SEWER LATERAL CANNOT BE PROVIDED INSTALL 8" SDR 35 SLEEVE AS DIRECTED BY THE ENGINEER.
7. FOR SERVICE CONNECTION REPAIRS; CONTRACTOR SHALL REPLACE A MINIMUM OF 6 LF OF OF 6 " PVC AND/OR FITTINGS AS REQUIRED.
8. ALL NEW CLEAN OUTS INSTALLED THAT ARE NOT IN CITY CONCRETE SIDEWALKS SHALL HAVE A 4" THICK CONCRETE COLLAR.



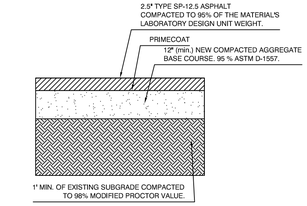
1 Typical Sewer Service Connection
NTS



DITCH WIDTH REQUIRED TO COMPACT BEDDING	
PIPE OD	X MINIMUM
6"- 36"	8"
38"- 84"	18"
86"-144"	24"

SCHEDULE	
STAGE	MATERIAL
#1	BEDDING WHERE DIRECTED GRANULAR MATERIAL (SAND, GRAVEL, OR RECLAIMED CONCRETE), W/WATERSTOP AT 100' INTERVALS
#2	BEDDING ZONE (LOCAL SAND) MATERIALS A-1, A-2, OR A-3
#3	COVER ZONE (LOCAL SAND) MATERIALS A-1, A-2, OR A-3
#4	TOP ZONE - MATERIALS PER FDOT STANDARD INDEX No. 505 PAVED ROADWAYS-IN 6" LIFTS UNPAVED ROADWAYS-IN 6" LIFTS GRASS SURFACE-IN 12" LIFTS

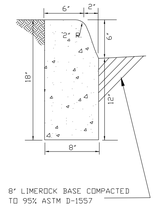
2 Pipe Bedding Detail
NTS



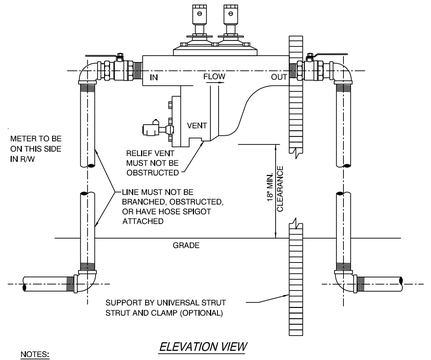
Notes:

All Pavement Materials shall be in accordance with the Florida Department of Transportation Standard Specifications.

3 Asphalt Pavement Road Repair Detail
NTS



4 FDOT Type "D"
NTS

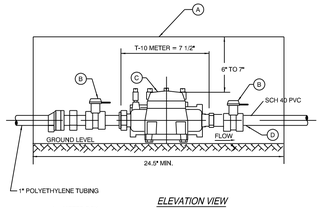


ELEVATION VIEW

NOTES:

1. THE ASSEMBLY MUST BE INSTALLED ON THE CUSTOMER'S PROPERTY, AS CLOSE TO THE METER AS PRACTICAL.
2. THE ASSEMBLY MUST BE ACCESSIBLE FOR TESTING ANNUALLY, AND FOR OVERHAUL EVERY FIVE YEARS.
3. ACCEPTABLE ASSEMBLIES ARE THOSE THAT ARE APPROVED BY EITHER ASSE OR FCCCHR AND MEET THE MINIMUM DESIGN STANDARDS OF THE AWWA.

5 3/4" to 2" Backflow Preventer
NTS



ELEVATION VIEW

A= METER BOX
MID-STATES PLASTICS MODEL #MSBCF1324-12, OR APPROVED EQUAL

B= FORD LOCKABLE METER STOP OR APPROVED EQUAL

METER DIAMETER	METER STOP
3/4"x5/8"	No. B43-342 W *
1"	No. B43-344 W *

* "W" ON CATALOG NUMBER IS FOR PADLOCK WINGS.

C= SCHLUMBERGER METER/DOUBLE CHECK T-10 ASSEMBLY

D= CUSTOMER TIE-IN POINT

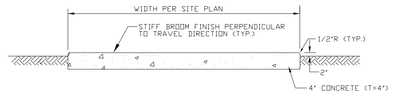
NOTE:

MINIMUM DISTANCES BETWEEN METER INLETS/OUTLETS AND THE CLOSEST FITTINGS SHALL BE MAINTAINED PER METER MANUFACTURERS REQUIREMENTS.

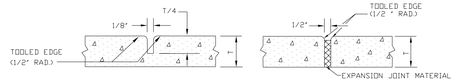
6 5/8" T-10 Meter w/ Double Check Valve Assembly
NTS

NEW CONSTRUCTION NOTES

1. NEW SLABS AND PAVEMENT SHALL BE GRADED TO POSITIVELY DRAIN WITHOUT ANY STORMWATER PONDING.
2. PROVIDE CONTRACTION JOINTS AT 12' O.C. MAX. JOINT PATTERNS IN SLABS AND SIDEWALKS SHALL BE GENERALLY SQUARE AT CURBS PROVIDE FULL DEPTH EXPANSION JOINTS AT 100 FT. O.C. MAX. AND AT LOCATIONS WHERE STRAIGHT CURB RUNS CHAGE DIRECTIONS. AT SIDEWALKS PROVIDE WEAKENED PLANE CONTRACTION JOINTS NOT MORE THAN 5'-0" MAX. AND EXPANSION JOINTS AT 20-FT. O.C. MAX (TOOL ALL EDGES). INSTALL SELF-LEVELING SEALENT AT ALL ISOLATION/ EXPANSION JOINTS.



TYPICAL SIDEWALK SECTION



CONTRACTION JOINT EXPANSION JOINT

NOTES:

1. PROVIDE EXPANSION JOINTS WHERE NEW SIDEWALKS ABUT STRUCTURES AND CONTRACTION JOINTS AT INTERVALS EQUAL TO SIDEWALK WIDTH.
2. REPLACE CONCRETE SIDEWALKS AT SCORED JOINTS TO AVOID A PATCHED APPEARANCE. PROVIDE 2-INCH LEVELING COURSE BENEATH NEW SIDEWALK.
3. CONCRETE PAD AT LIFT STATION SHALL BE 6" THICK.

7 Typical Sidewalk and 6" Concrete Pad Detail
NTS

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Interior Design • Landscape Architecture
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PROJECT NAME:

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KEY WEST, FL 33040

SUB-CONSULTANT INFORMATION:

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PROFESSIONAL SEAL:

ALLEN E. PEREZ — No. 51468 — STATE OF FLORIDA — PROFESSIONAL ENGINEER

ALLEN E. PEREZ, P.E. **May 1, 2017**
FLORIDA 51468

SUBMITTAL DESCRIPTION / MILESTONE:

BID SET
May 1, 2017

REVISIONS:

DRAWING SHEET INFORMATION

BA PROJECT NO.:	XXXX
SCALE:	AS NOTED
DATE:	June 10, 2016
DRAWN BY:	UT
CHECKED BY:	TO

DRAWING TITLE:
DETAILS

SHEET NO.
C-03

FLORIDA DEPARTMENT OF TRANSPORTATION GENERAL NOTES:

1. CONTACT THE LOCAL MAINTENANCE OFFICE (305) 289-4360 TO COORDINATE PRE-CONSTRUCTION MEETING FOURTEEN (14) WORKING DAYS AND TO PROVIDE FORTY-EIGHT (48) HOURS NOTIFICATION PRIOR TO BEGINNING PERMITTED WORK.

2. SUBMIT LANE CLOSURE REQUESTS AT THE LANE CLOSURE INFORMATION SYSTEM WEBSITE (http://gis.atectrans.net/lcis/) FOURTEEN (14) WORKING DAYS PRIOR TO BEGINNING WORK WITHIN THE FDOT RIGHT-OF WAY.

3. WORKING HOURS WITHIN THE STATE RIGHT-OF-WAY SHALL BE FROM 9:00 AM TO 4:00 PM, OR AS DIRECTED BY THE DEPARTMENT REPRESENTATIVE PRIOR TO COMMENCING WORK. THERE SHALL BE NO LANE CLOSURES ON WEEKENDS, HOLIDAYS AND SPECIAL EVENTS WITHOUT PRIOR WRITTEN APPROVAL..

4. VALIDITY OF THIS PERMIT IS CONTINGENT UPON OBTAINING REQUIRED PERMITS FROM ALL OTHER AGENCIES INVOLVED.

5. ALL WORK MUST BE IN ACCORDANCE WITH THE LATEST *FDOT UTILITY ACCOMMODATION MANUAL, FDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION AND FDOT DESIGN STANDARDS.*

6. PERMITTEE IS CAUTIONED THAT UTILITIES MAY BE LOCATED WITHIN THE CONSTRUCTION AREA. CALL 811 TWO (2) DAYS PRIOR TO BEGINNING WORK.

7. SAFE TEMPORARY ACCESS TO ALL ADJACENT PROPERTIES MUST BE PROVIDED AND MAINTAINED AT ALL TIMES. ACCOMMODATIONS FOR INTERSECTING TRAFFIC WITHIN THE CONSTRUCTION ZONE MUST BE PROVIDED AND MAINTAINED AT ALL TIMES. NO ROAD OR STREET CROSSING SHALL BE BLOCKED OR UNDULY RESTRICTED AS DETERMINED BY THE FDOT DEPARTMENT REPRESENTATIVE. ALL ACCESSES SHALL REMAIN OPEN AT ALL TIMES.

8. NO UNSAFE AREA(S) FOR PEDESTRIANS WILL REMAIN DURING ANY TIME OF THE CONSTRUCTION. PEDESTRIAN CONTROL FOR CLOSURE OF ROADS AND SIDEWALKS SHALL BE IN ACCORDANCE WITH LATEST *FDOT DESIGN STANDARDS AND FDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.*

9. A COPY OF THE APPROVED PERMIT, APPROVED PLANS AND APPROVED LANE CLOSURE(S) MUST BE KEPT ON THE JOB SITE AT ALL TIMES DURING THE PERMITTED WORK.

10. IN THE EVENT THAT THE ROADWAY PAVEMENT IS DAMAGED, IT SHALL BE RESTORED IN FULL LANE TO MATCH OR EXCEED EXISTING CONDITIONS AND IN ACCORDANCE WITH THE *LATEST FDOT DESIGN STANDARDS AND STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.*

11. OPEN CUTTING OF EXISTING PAVED DRIVEWAY CONNECTIONS AND SIDE STREETS SHALL BE RESTORED IN FULL LANE FROM EDGE OF PAVEMENT TO FDOT RIGHT-OF-WAY LINE.

12. THE USE OF STEEL PLATES WILL BE AT THE DISCRETION AND APPROVAL OF THE DEPARTMENT REPRESENTATIVE. PLATES MUST BE SECURED WITH SPIKES AND COMPACTED ASPHALT.

13. TYPE D4 FILTER FABRIC IS REQUIRED BY THE DEPARTMENT TO BE PLACED WHERE ANY MATERIAL THAT CAN, DURING THE PROJECT LIFE BE SUBJECTED TO HIGH WATER TABLE, WHETHER IT IS PLACED IN THE DRY OR IN THE WET AND REQUIRES A FULL ENCAPSULATION OF THE GRANULAR MATERIAL.

14. WHEN PERMITTED WORK IS WITHIN FIVE (5) FT OF THE EXISTING TREES' DRIP LINES, TREE PROTECTION MEETING THE *FDOT 2013 DESIGN STANDARD INDEX 542* MUST BE INSTALLED.

15. ROOT OR CANOPY TRIMMING REQUIRED TO REDUCE THE IMPACTS TO THE EXISTING VEGETATION MUST BE OVERSEEN BY A CERTIFIED ARBORIST.

16. FDOT APPROVED EROSION DEVICES MUST BE PLACED BEFORE PERMITTED WORK BEGINS AND MAINTAINED THROUGHOUT THE PROJECT.

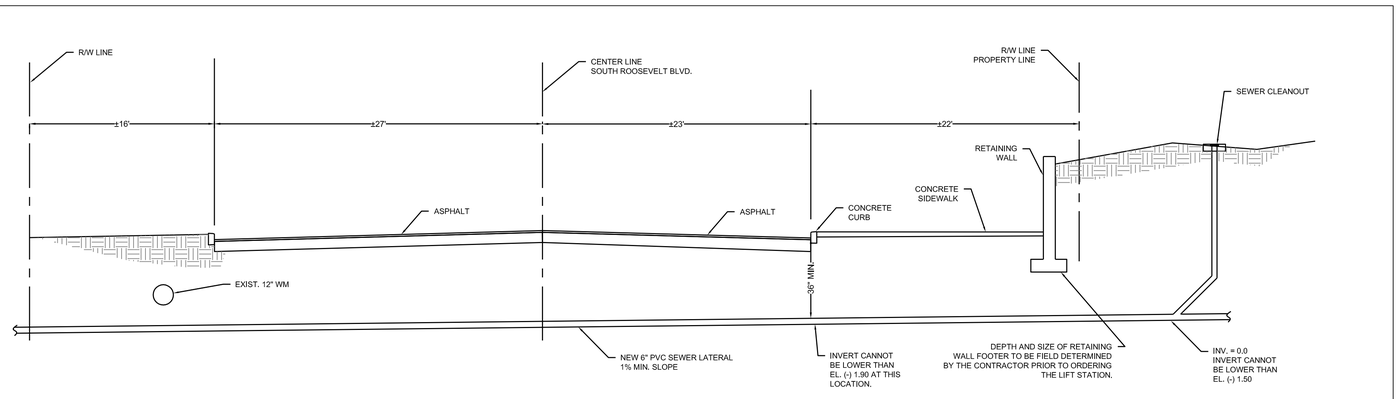
17. ALL FINAL RESTORATION SHALL BE COORDINATED WITH THE DEPARTMENT REPRESENTATIVE. ALL PORTIONS OF THE STATE RIGHT-OF-WAY SHALL BE RESTORED WITHIN THIRTY (30) DAYS OF COMPLETION OF THE PERMITTED WORK.

18. WHEN FDOT ROADWAY IMPROVEMENTS HAVE COMMENCED OR BEEN COMPLETED PRIOR TO COMPLETION OF WORK PERMITTED UNDER THIS PERMIT, THIS PERMIT SHALL BECOME VOID.

ENVIRONMENTAL NOTES:

1. ENSURE APPROPRIATE EROSION CONTROL DEVICES ARE IN PLACE BEFORE WORK BEGINS AND ARE USED THROUGHOUT THE PROJECT.

2. NO CONTAMINATION ISSUES ARE EXPECTED GIVEN THE SCOPE OF THE PROJECT; HOWEVER, THE FOLLOWING PROTOCOL SHOULD BE IMPLEMENTED:
-IN THE EVENT THAT SOIL OR GROUNDWATER CONTAMINATION IS IDENTIFIED DURING EXCAVATION, THE APPLICANT IS TO CONTACT THE ASSISTANT CONTAMINATION IMPACT COORDINATOR AT (305) 470-5138 AND PROVIDE THE DEPARTMENT COPIES OF CONTAMINATION-RELATED DELIVERABLES SUBMITTED TO ENVIRONMENTAL REGULATORY AGENCIES. THE REPORTS ARE TO BE SUBMITTED TO THE DISTRICT CONTAMINATION IMPACT COORDINATOR AT 1000 N.W. 111TH AVENUE, MIAMI, FL 33172-5800 (ROOM #6109).



CROSS SECTION - SANITARY SEWER SERVICE

NTS

KEY MAP

NTS

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& PARTNERS INC

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Interior Design • Landscape Architecture
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P. O. BOX 1409
3140 FLAGLER AVENUE
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SUBMITTAL DESCRIPTION / MILESTONE:

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May 1, 2017

REVISIONS:

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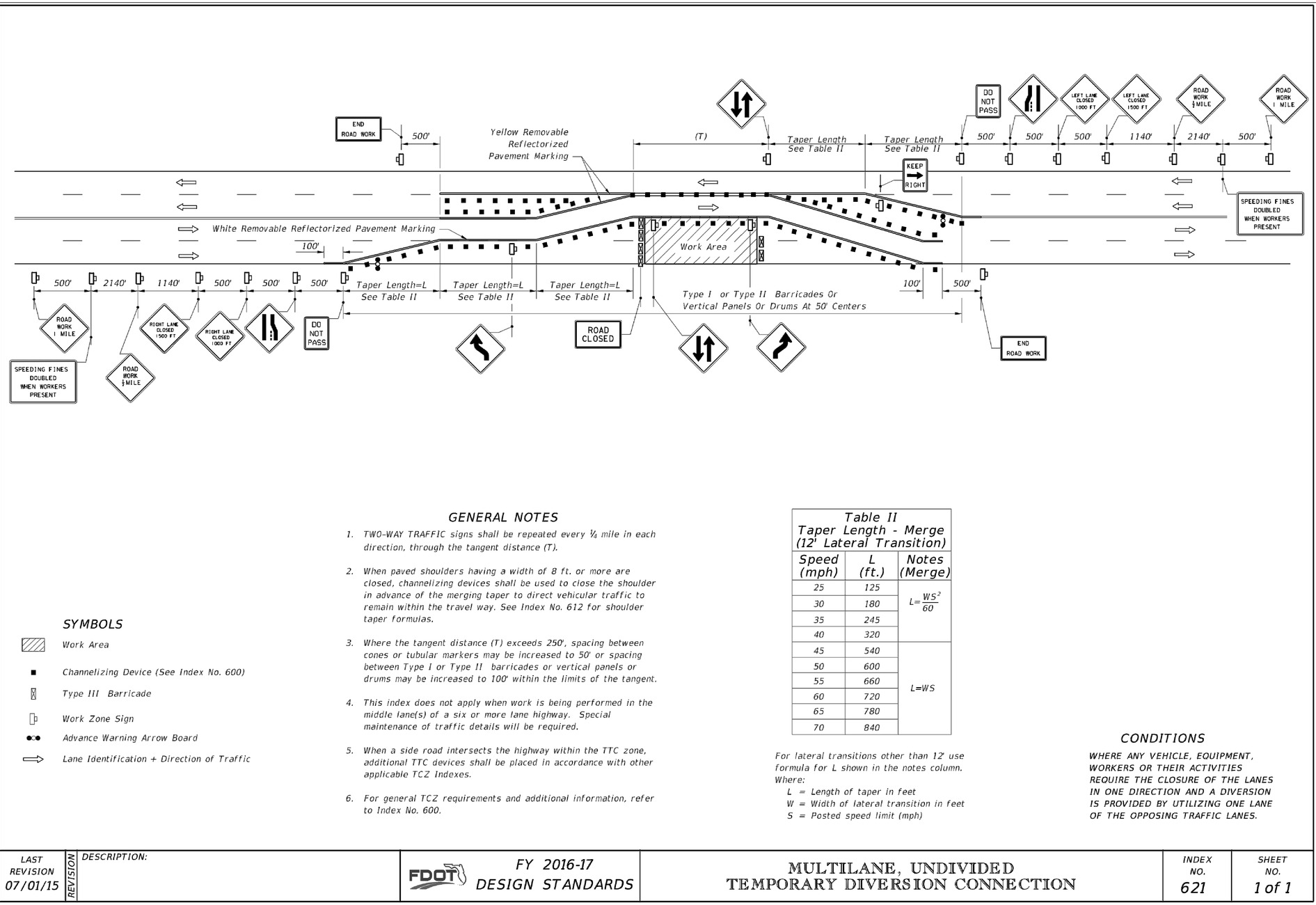
DRAWING SHEET INFORMATION

BA PROJECT NO.:	XXXX
SCALE:	AS NOTED
DATE:	June 10, 2016
DRAWN BY:	UT
CHECKED BY:	TO

DRAWING TITLE:
FDOT GENERAL NOTES AND SECTION

SHEET NO.
C-04



SYMBOLS

- Work Area
- Channelizing Device (See Index No. 600)
- Type III Barricade
- Work Zone Sign
- Advance Warning Arrow Board
- Lane Identification + Direction of Traffic

GENERAL NOTES

1. TWO-WAY TRAFFIC signs shall be repeated every ¼ mile in each direction, through the tangent distance (T).
2. When paved shoulders having a width of 8 ft. or more are closed, channelizing devices shall be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the travel way. See Index No. 612 for shoulder taper formulas.
3. Where the tangent distance (T) exceeds 250', spacing between cones or tubular markers may be increased to 50' or spacing between Type I or Type II barricades or vertical panels or drums may be increased to 100' within the limits of the tangent.
4. This index does not apply when work is being performed in the middle lane(s) of a six or more lane highway. Special maintenance of traffic details will be required.
5. When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
6. For general TCZ requirements and additional information, refer to Index No. 600.

Table II
Taper Length - Merge (12' Lateral Transition)

Speed (mph)	L (ft.)	Notes (Merge)
25	125	$L=\frac{WS^2}{60}$
30	180	
35	245	
40	320	
45	540	L=WS
50	600	
55	660	
60	720	
65	780	
70	840	

For lateral transitions other than 12' use formula for L shown in the notes column.
Where:
L = Length of taper in feet
W = Width of lateral transition in feet
S = Posted speed limit (mph)

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES REQUIRE THE CLOSURE OF THE LANES IN ONE DIRECTION AND A DIVERSION IS PROVIDED BY UTILIZING ONE LANE OF THE OPPOSING TRAFFIC LANES.

12/3/2015 9:07:45 AM

LAST REVISION	REVISION	DESCRIPTION:	FDOT	INDEX NO.	SHEET NO.
07/01/15			FY 2016-17 DESIGN STANDARDS	621	1 of 1

MULTILANE, UNDIVIDED
TEMPORARY DIVERSION CONNECTION

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May 1, 2017

REVISIONS:

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SCALE:	AS NOTED
DATE:	June 10, 2016
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CHECKED BY:	TO

DRAWING TITLE:
FDOT MOT PLAN

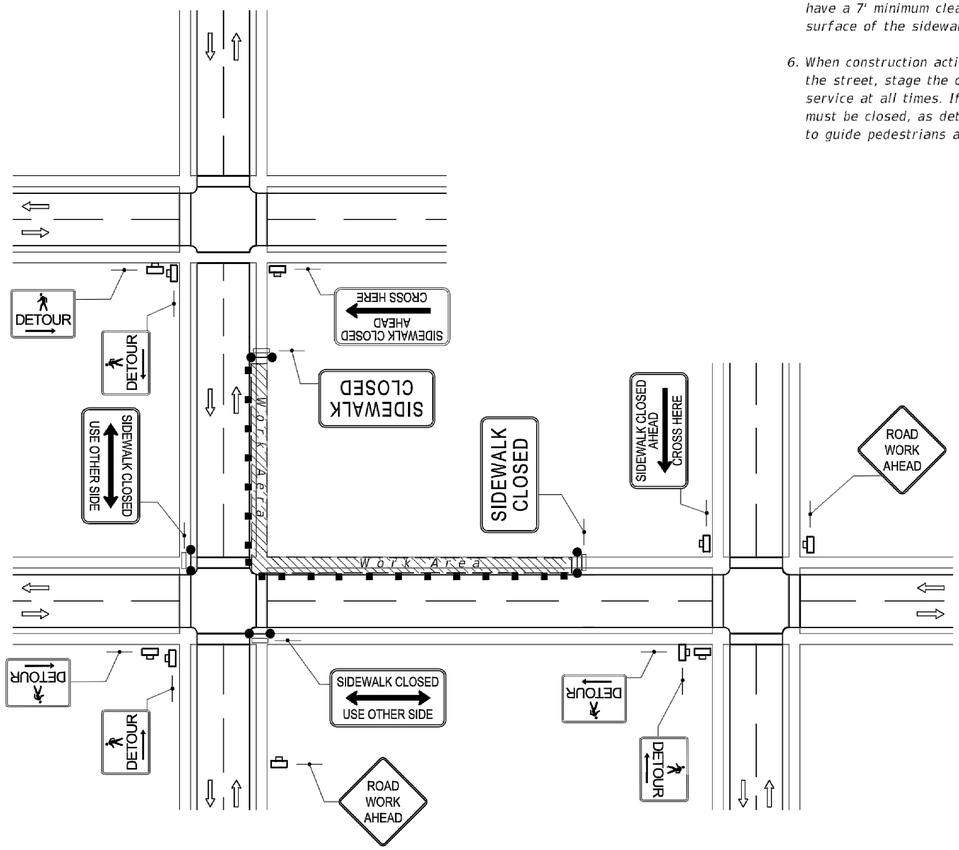
SHEET NO.
C-05

SYMBOLS

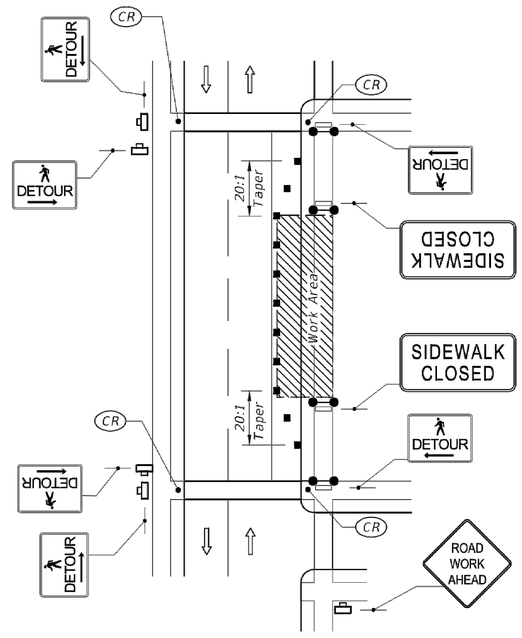
- Work Area
- Channelizing Device (See Index 600)
- Work Zone Sign
- CR — Required Locations For Either Temporary Or Permanent Curb Ramps.
- Lane Identification + Direction of Traffic
- Pedestrian Longitudinal Channelizing Device (LCD) with Mounted Work Zone Sign
- Pedestrian Longitudinal Channelizing Device (LCD)

GENERAL NOTES

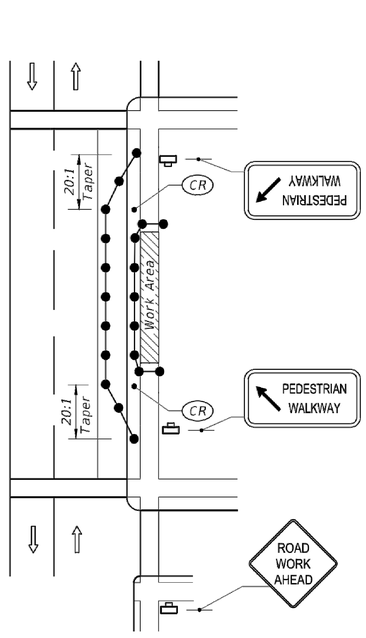
1. Route pedestrian traffic around work areas when construction activities encroach on the sidewalk for more than 60 minutes using the devices and remedies shown on this Index. Use project specific designs for scenarios not included on this Index.
2. For spacing of traffic control devices and general TCZ requirements refer to Index 600. The maximum spacing between barricades, vertical panels, drums or tubular markers is 25'.
3. Use delineators on longitudinal channelizing devices separating the work area from vehicular traffic.
4. Cover or deactivate pedestrian traffic signal display(s) controlling closed crosswalks.
5. Post mounted signs located near or adjacent to a sidewalk must have a 7' minimum clearance from the bottom of sign to the surface of the sidewalk.
6. When construction activities involve sidewalks on both sides of the street, stage the construction so that one sidewalk is in service at all times. If this is not feasible and both sidewalks must be closed, as determined by the Engineer, provide a detour to guide pedestrians around the construction zone.
7. Provide a 5' wide temporary walkway, except where space restrictions warrant a minimum width of 4'. Provide a 5' x 5' passing space for temporary walkways less than 5' in width at intervals not to exceed 200'.
8. Provide a cross-slope with a maximum value of 0.02 for all temporary walkways.
9. Temporary walkway surfaces and ramps must be stable, firm, slip resistant, and kept free of any obstructions and hazards such as holes, debris, mud, construction equipment and stored materials.
10. Remove temporary walkways immediately after reopening of the sidewalk, unless otherwise noted in the plans.
11. Meet the requirements of Index 304 for temporary curb ramps.
12. Place pedestrian longitudinal channelizing device(s) across the full width of the closed sidewalk. For temporary walkways, similar to the Sidewalk Diversion, place LCD's to delineate both sides of the temporary walkway.



CROSSWALK CLOSURE AND PESESTRIAN DETOUR



SIDEWALK DETOUR



SIDEWALK DIVERSION

12/3/2015 9:11:57 AM

LAST REVISION	REVISION	DESCRIPTION:	FDOT FY 2016-17 DESIGN STANDARDS	PEDESTRIAN CONTROL FOR CLOSURE OF SIDEWALKS	INDEX NO.	SHEET NO.
07/01/15					660	1 of 1

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PREPARED FOR/OWNER:
CITY OF KEY WEST, FL
P. O. BOX 1409
3140 FLAGLER AVENUE
KEY WEST, FL 33041

PROJECT NAME:
SMATHERS BEACH RESTROOM

PROJECT LOCATION/ADDRESS:
SOUTH ROOSEVELT BLVD.
KEY WEST, FL 33040

SUB-CONSULTANT INFORMATION:
PEREZ ENGINEERING & DEVELOPMENT, INC.
Certificate of Authorization No. 8579
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Fax (305) 296-0243

PROFESSIONAL SEAL:
ALLEN E. PEREZ No. 51468 STATE OF FLORIDA PROFESSIONAL ENGINEER

ALLEN E. PEREZ, P.E. **May 1, 2017**
FLORIDA 51468

SUBMITTAL DESCRIPTION / MILESTONE:
BID SET
May 1, 2017

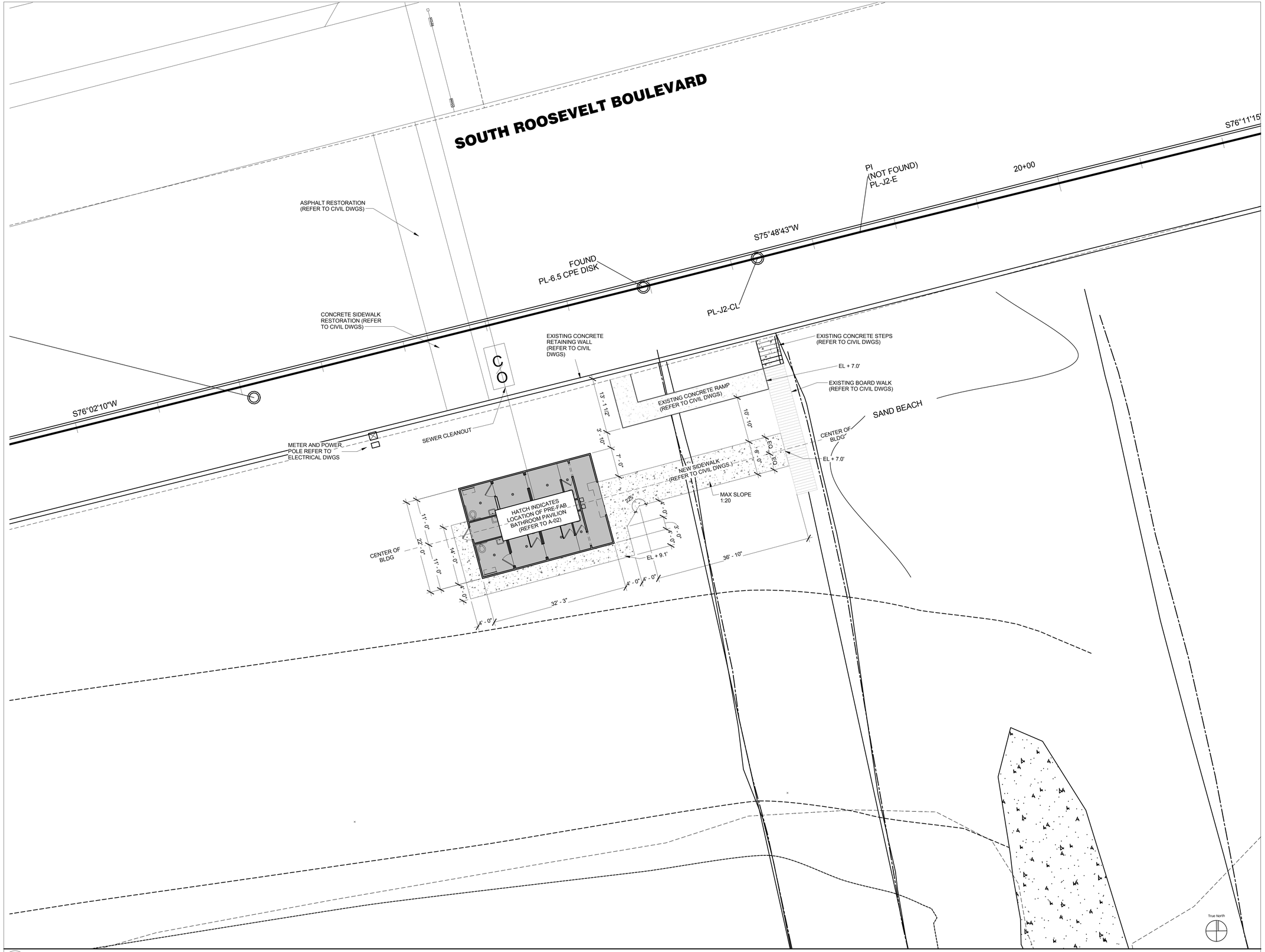
REVISIONS:

DRAWING SHEET INFORMATION

BA PROJECT NO.:	XXXX
SCALE:	AS NOTED
DATE:	June 10, 2016
DRAWN BY:	UT
CHECKED BY:	TO

DRAWING TITLE:
FDOT MOT PLAN

SHEET NO.
C-06



1 A-01 ARCHITECTURAL SITE PLAN
1" = 10'-0"

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& PARTNERS INC

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PREPARED FOR/OWNER:

CITY OF KEY WEST, FL
P. O. BOX 1409
3140 FLAGLER AVENUE
KEY WEST, FL 33041

PROJECT NAME:

SMATHERS BEACH BATHROOM BUILDING

PROJECT LOCATION/ADDRESS:

SOUTH ROOSEVELT BLVD.
KEY WEST, FL 33040

SUB-CONSULTANT INFORMATION:

TODD D. OSBORN, R.A.
FL. ARCHITECT REG. NO. AR 92877

PROFESSIONAL SEAL:

SUBMITTAL DESCRIPTION / MILESTONE:

BID SET
May 1st, 2017

REVISIONS:

DRAWING SHEET INFORMATION

BA PROJECT NO.: 14041
SCALE: 1" = 10'-0"
DATE:

DRAWING TITLE:

ARCHITECTURAL SITE PLAN

SHEET NO.

A-01

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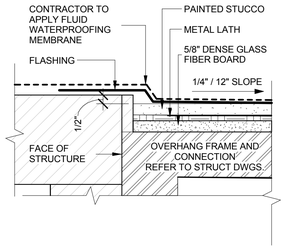
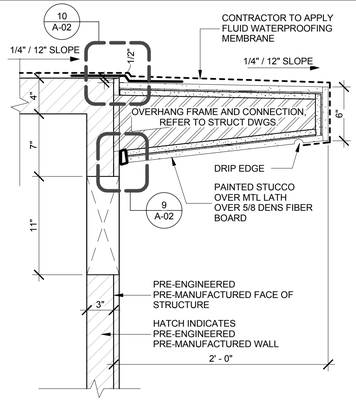
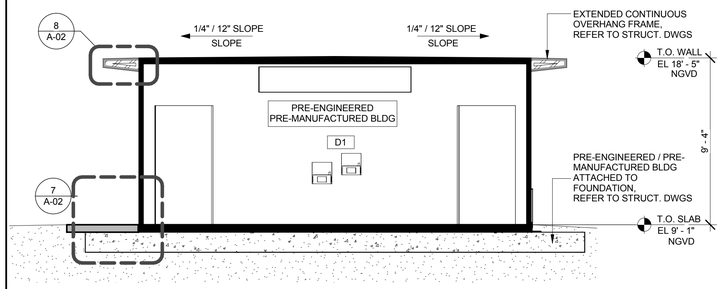


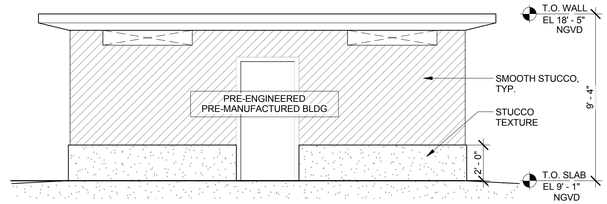
10 A-02 DETAIL TOP @ ROOF OVERHANG
A-02 3" = 1'-0"



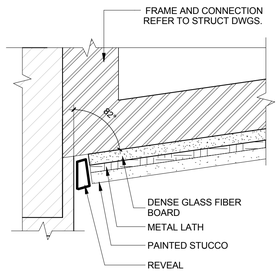
8 A-02 DETAIL SECTION - EXTENDED CONT. ROOF OVERHANG FRAME
A-02 1 1/2" = 1'-0"



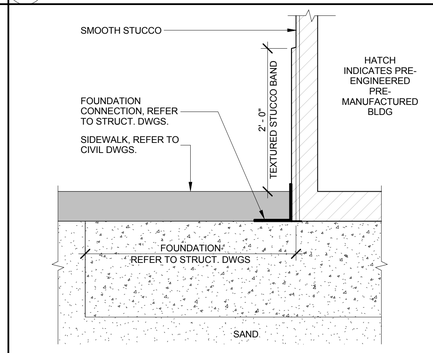
6 A-02 PRE-FAB BATHROOM BUILDING SECTION
A-02 1/4" = 1'-0"



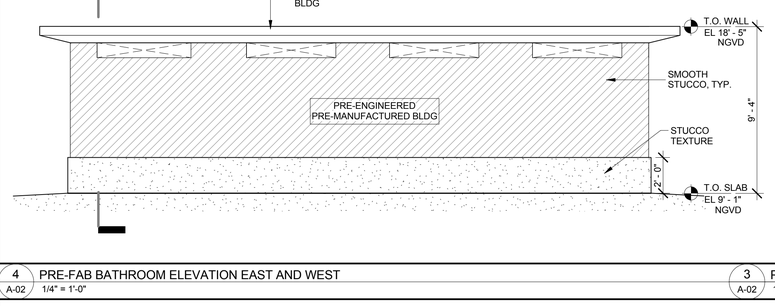
5 A-02 PRE-FAB BATHROOM ELEVATION SOUTH
A-02 1/4" = 1'-0"



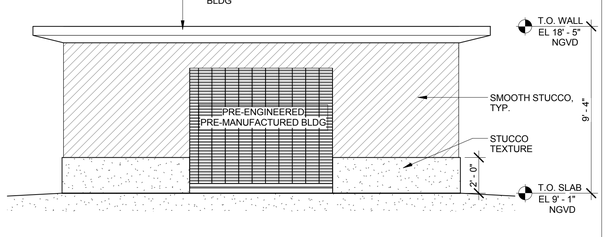
9 A-02 DETAIL BOTTOM @ ROOF OVERHANG
A-02 3" = 1'-0"



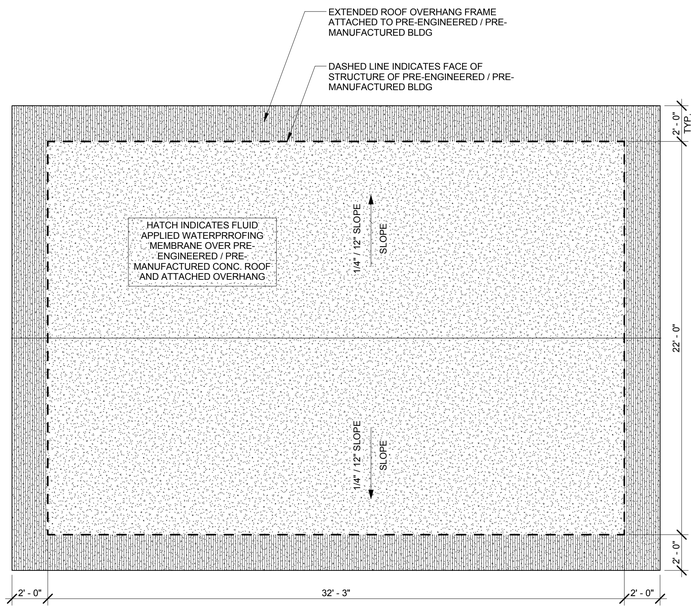
7 A-02 DETAIL SECTION - FOUNDATION
A-02 1" = 1'-0"



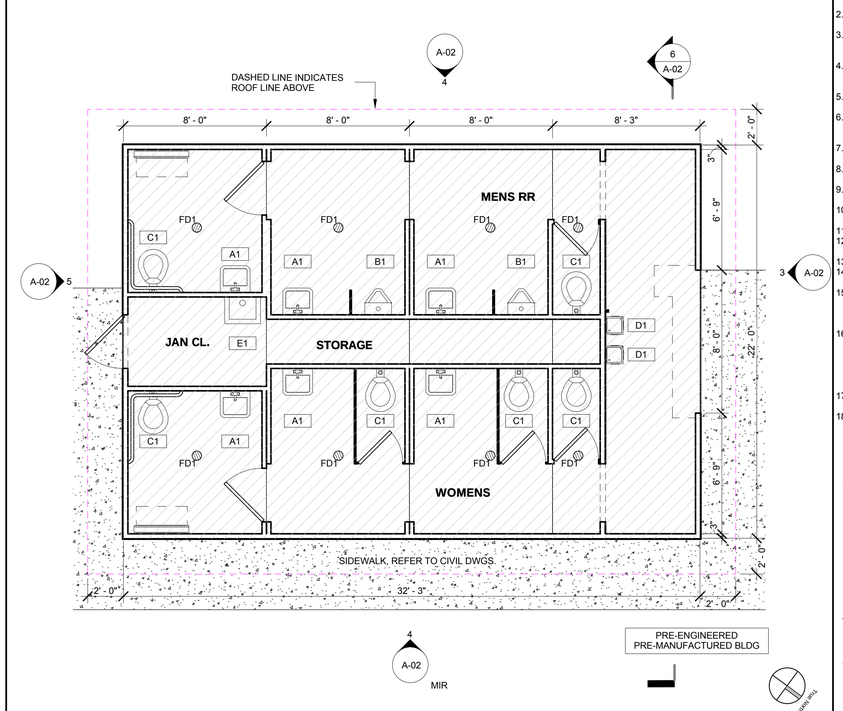
4 A-02 PRE-FAB BATHROOM ELEVATION EAST AND WEST
A-02 1/4" = 1'-0"



3 A-02 PRE-FAB BATHROOM ELEVATION NORTH
A-02 1/4" = 1'-0"



2 A-02 PRE-FAB BATHROOM ROOF PLAN
A-02 1/4" = 1'-0"



1 A-02 PRE-FAB BATHROOM FLOOR PLAN
A-02 1/4" = 1'-0"

NOTES:
1. BATHROOMS ARE PRE-ENGINEERED / PRE-MANUFACTURED CONNECTED TO STRUCTURAL FOUNDATION, REFER TO STRUCT. DWGS.
2. EXTENDED METAL ROOF OVERHANG FRAME ATTACHED TO PRE-ENGINEERED / PRE-MANUFACTURED BUILDING, REFER TO STRUCT. DWGS.
3. ALL BATHROOM PLUMBING FIXTURES AND ACCESSORIES PROVIDED BY PRE-ENGINEERED / PRE-MANUFACTURED BUILDING INCLUDING SINKS, LAVATORIES, MIRROR, SOAP DISPENSER, TOILET PAPER DISPENSER AND GRAB BARS TO BE COMMERCIAL GRADE AND MEET ALL ADA CLEARANCE REQUIREMENTS.
4. PROVIDED BY PRE-ENGINEERED / PRE-MANUFACTURED BUILDING NOA APPROVED FIBERGLASS DOORS AND FRAME. ALL ASSOCIATED HARDWARE TO BE NON-CORROSIVE MATERIAL INCLUDING ADA ACCESSIBLE THRESHOLD PROVIDED BY PRE-ENGINEERED / PRE-MANUFACTURED BUILDING.
5. PROVIDED BY PRE-ENGINEERED / PRE-MANUFACTURED BUILDING ALUMINUM GRILL OVERHEAD DOOR INCLUDING TRACKS, COMPONENTS, ASSOCIATED FRAMING, FASTENERS, ETC. AS REQUIRED.
6. UNLESS OTHERWISE NOTED, ALL BATHROOM INTERIOR CONCRETE WALLS ARE PAINTED STUCCO FINISH ABOVE. EXTERIOR PERIMETER WALLS ENCLOSING BUILDING SHALL BE PAINTED SMOOTH FINISH. PROVIDED BY PRE-ENGINEERED / PRE-MANUFACTURED BUILDING.
7. NEW EPOXY COATING OVER WALLS AND CONCRETE FLOOR SLAB SLOPING TO FLOOR DRAINS. PROVIDED BY PRE-ENGINEERED / PRE-MANUFACTURED BUILDING.COATING TO MEET VOC REQUIREMENTS OF 100G/L MAX.
8. H.C. / ADA COMPLIANT HI-LO DRINKING FOUNTAIN WITH NO EXPOSED PLUMBING. PROVIDED BY PRE-ENGINEERED / PRE-MANUFACTURED BUILDING
9. PHENOLIC RESTROOM PARTITION DOORS (3'-0 MIN. x 5'-0" HIGH), PROVIDED BY PRE-ENGINEERED / PRE-MANUFACTURED BUILDING
10. CONTRACTOR TO COORDINATE WITH CITY AN ACCEPTABLE LOCATION FOR STAGING, EQUIPMENT AND LAY-DOWN AREA FOR ALL WORK.
11. REFER TO STRUCTURAL PLANS FOR ADDITIONAL DETAILS AND NOTES NOT SHOWN IN THIS PLAN.
12. EXPOSED PHG: NO CLG. / OPEN TO PTD. HIGH GLOSS SLAB ABOVE, PROVIDED BY PRE-ENGINEERED / PRE-MANUFACTURED BUILDING.
13. ALL LIGHTING PROVIDED BY PRE-ENGINEERED / PRE-MANUFACTURED BUILDING.
14. SHOP DRAWING FOR ALL PRE-ENGINEERED / PRE-MANUFACTURED COMPONENTS MUST BE SIGNED AND SEALED BY FLORIDA LICENSED ENGINEER
15. THE AWARDED GENERAL CONTRACTOR AND PRE-ENGINEERED / PRE-MANUFACTURED BATHROOM COMPANY SHALL MEET THE REQUIREMENTS OF THE KEY WEST ORDINANCE FOR FLOOD DAMAGE RESISTANCE FOR PUBLIC RESTROOM AS PER 13-133 FLOOD RESISTANT DEVELOPMENT; BUILDINGS AND STRUCTURES, SECTION (3) "PUBLIC RESTROOMS".
16. IT IS THE GENERAL CONTRACTOR'S RESPONSIBILITY TO FULLY COORDINATE WITH THEIR PRE-ENGINEERED / PRE-MANUFACTURED BATHROOM COMPANY SUB ON WHAT SPECIFIC ELEMENTS OF THE BATHROOM BUILDING ARE INCLUDED IN THE PRE-ENGINEERED / PRE-MANUFACTURED BATHROOM SCOPE AND WHAT ITEMS RELATED TO THE BATHROOM BUILDING ARE TO BE PROVIDED BY THE GENERAL CONTRACTOR OR OTHER TRADES/SUBS TO INSURE ALL ELEMENTS RELATED TO THE BATHROOM BUILDING MEET THE DESIGN INTENT OF THIS DOCUMENT SET.
17. CBI PROVIDED A COASTAL ENGINEERING ANALYSIS REPORT TO SATISFY THE REQUIRMENTS OF THE CITY OF KEY WEST FLOOR-RESISTANT DEVELOPMENT ORDINANCE FOR DEVELOPMENT IN A VE FLOOD ZONE.
18. A COPY OF THE SOIL REPORT BY NUTTING ENGINEERING, REFER TO STRUCTURAL DWGS. GENERAL NOTE "SITE AND SOIL PREPERATION"

PLUMBING FIXTURES AND BATHROOM ACCESSORIES SPECIFICATIONS:

NOTE: ALL FIXTURES AND ACCESSORIES PROVIDED BY PRE-ENGINEERED PRE-MANUFACTURED BLDG

FIXTURES

A1	**LAVATORY**	AMERICAN STANDARD LUCERNE ADA WALL HUNG 0356.041 OR EQUAL AMERICAN STANDARD METERING FAUCETS: PILLAR TAP FAUCET 1.0 GPM 1340.105 OR EQUAL
B1	**URINAL**	KOHLERWALL MOUNTED KOHLER FRESHMAN 1.0 gpf REAR-INLET URINAL K-4989-R OR EQUAL SLOAN OPTIMA URINAL FLUSHOMETER ROYAL 195-1 ES-S TMO SWB OR EQUAL
C1	**TOILET**	WALL MOUNTED ADA KOHLER KINGSTON BOWL K-4323 OR EQUAL SLOAN ROYAL PRISON WC FLUSHOMETER 603 OR EQUAL SLOAN MICRO PLUMB TRANSFORMER EL-154 OR EQUAL (FOR FLUSHOMETER)
D1	**DKG FTN**	HALSEY TAYLOR HTV/ZBLSS-WF STAINKESS STEEL OR EQUAL
E1	**SINK MOP**	ADVANCE TABCO, INC. 9-OP-20-X 16" x 20" x 6" STAINKESS STEEL OR EQUAL
FD1	**FL DRAIN**	

BATHROOM ACCESSORIES

HAND DRYER	XLERATOR XL-W OR EQUAL
BABY CHANGER	KOALA KARE KB110-SSWM HORIZONTAL WALL MOUNTED STAINLESS STEEL FINISH OR EQUAL.
SAN NAPKIN DISP.	BOBRICK SURFACE MOUNTED B-270 OR EQUAL
TOILET TISSUE DISP.	BOBRICK SURFACE MOUNTED SINGLE JUMBO ROLL B-2890 OR EQUAL
NAPKIN VENDOR	BOBRICK RECESSED B-37063 OR EQUAL
MIRROR	BOBRICK STAINLESS STEEL CHANNEL FRAME B-165 OR EQUAL
GRAB BARS	BOBRICK 1 1/2" DIAMETER STAINLESS STEEL WITH SNAP FLANGE B-6806 OR EQUAL

NOTE: EXACT LOCATION TO BE COORDINATED BETWEEN CONTRACTOR, CITY AND ARCHITECT.

BERMELLO AJAMIL & PARTNERS INC

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PREPARED FOR/OWNER:

CITY OF KEY WEST, FL
P. O. BOX 1409
3140 FLAGLER AVENUE
KEY WEST, FL 33041

PROJECT NAME:

SMATHERS BEACH BATHROOM BUILDING

PROJECT LOCATION/ADDRESS:

SOUTH ROOSEVELT BLVD.
KEY WEST, FL 33040

SUB-CONSULTANT INFORMATION:

PROFESSIONAL SEAL:

TODD D. OSBORN, R.A.
FL. ARCHITECT REG. NO. AR 92877

SUBMITTAL DESCRIPTION / MILESTONE:

BID SET
May 1st, 2017

REVISIONS:

DRAWING SHEET INFORMATION

BA PROJECT NO.: 14041
SCALE: As indicated
DATE:

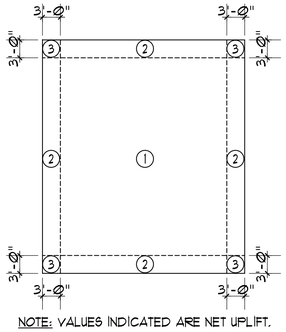
DRAWING TITLE:

PRE-FAB BATHROOM AND DETAIL

SHEET NO.

A-02

6/9/2017 10:11:04 AM



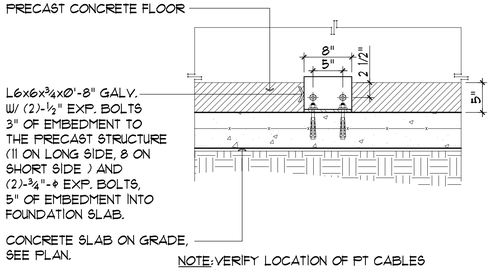
NOTE: VALUES INDICATED ARE NET UPLIFT.

ZONE	WIND LOAD PRESSURES FOR ROOFING DESIGN
1	-44 P.S.F.
2	-79 P.S.F.
3	-122 P.S.F.

WIND LOAD PRESSURE FOR WINDOWS, DOORS AND PANELS. (POUNDS PER SQUARE FOOT)

AREA	ZONE 4		ZONE 5	
	POSITIVE	NEGATIVE	POSITIVE	NEGATIVE
10 ft.² to 25 ft.²	48 P.S.F.	51 P.S.F.	48 P.S.F.	63 P.S.F.
26 ft.² to 50 ft.²	45 P.S.F.	49 P.S.F.	45 P.S.F.	58 P.S.F.
51 ft.² to 100 ft.²	43 P.S.F.	47 P.S.F.	43 P.S.F.	54 P.S.F.
101 ft.² to 150 ft.²	41 P.S.F.	44 P.S.F.	41 P.S.F.	49 P.S.F.
151 ft.² AND UP	39 P.S.F.	43 P.S.F.	39 P.S.F.	47 P.S.F.

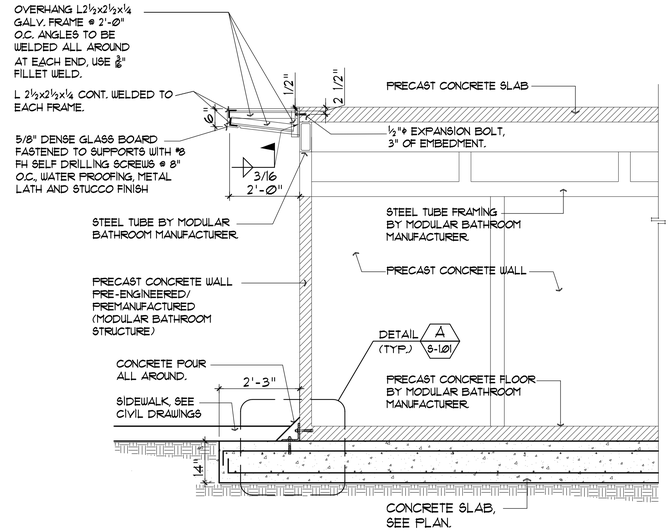
NOTES:
1.- ZONE 5 IS DEFINED AS ANY DOOR OR WINDOW WITHIN 4'-Ø" FROM ANY CORNER OF THE BUILDING. ALL OTHER LOCATIONS ARE DEFINED AS ZONE 4
2.- VALUES INDICATED CAN BE INTERPOLATED.



NOTE: VERIFY LOCATION OF PT CABLES IN THE PRECAST STRUCTURE TO AVOID WITH THE EXPANSION BOLTS.

A / S-1Ø1 **DETAIL**

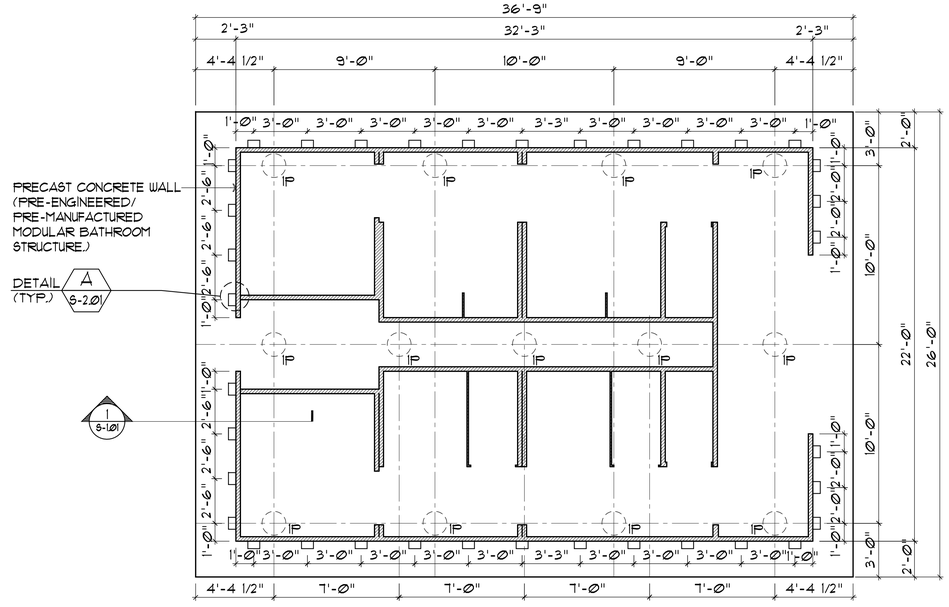
SCALE: 1"=1'-Ø"



NOTE: VERIFY LOCATION OF PT CABLES IN THE PRECAST STRUCTURE TO AVOID WITH THE EXPANSION BOLTS.

1 / S-1Ø1 **SECTION**

SCALE: 1/2"=1'-Ø"

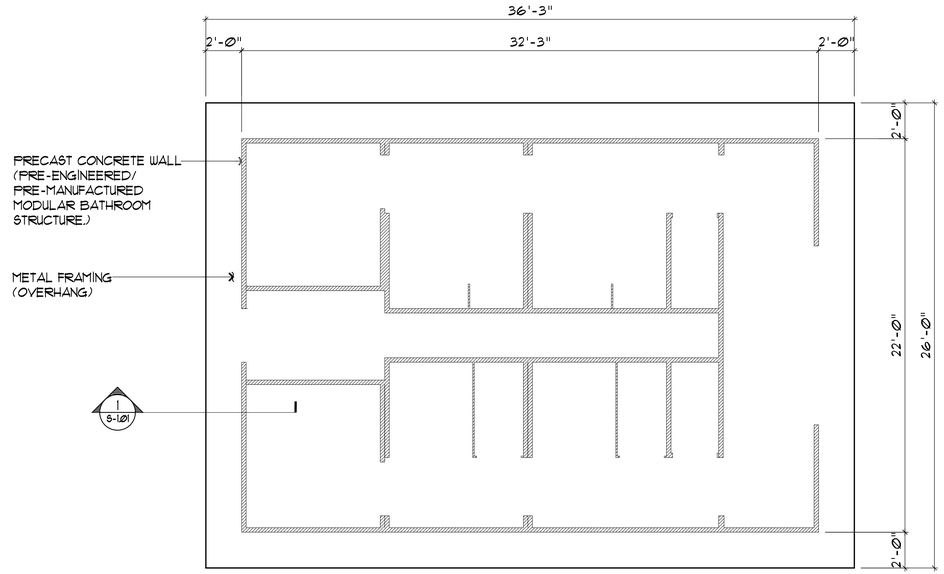


PLAN NOTES: GROUND FLOOR

1.- TOP OF SLAB ELEVATION = 4'-Ø", UNLESS OTHERWISE NOTED AS THUS (+ EL.)
2.- SLAB NOTE:
SLAB NOTE: 14" CONCRETE SLAB ON 10 MIL VAPOR BARRIER REINFORCED #5@12" o.c. EACH WAY, TOP AND BOTTOM.
3.- COORDINATE ALL SLAB OPENINGS AND DEPRESSIONS WITH ARCHITECTURAL AND MECHANICAL DRAWINGS.
4.- FOR GENERAL STRUCTURAL NOTES, SEE SHEET S-2.Ø1
5.- T.E. DENOTES 16"x8" DEEP THICKENED SLAB EDGE REINF. W/ (1) #4 TOP AND BOTTOM, TYP. AT ALL DISCONTINUOUS SLAB EDGES.
6.- SEE ARCHITECTURAL DRAWING FOR KEY PLAN.
7.- IP DENOTES 16" ø AUGER CAST PILE. SEE GENERAL NOTES.

BATHROOM FOUNDATION/GROUND FLOOR PLAN

SCALE: 1/4"=1'-Ø"



BATHROOM METAL OVERHANG PLAN

SCALE: 1/4"=1'-Ø"

PEDRO J. DUQUESNE, P.E.
FL. ENGINEER REG. NO 22764

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PREPARED FOR/OWNER:
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P. O. BOX 1409
3140 FLAGLER AVENUE
KEY WEST, FL 33041

PROJECT NAME:
SMATHERS BEACH BATHROOM BUILDING

PROJECT LOCATION/ADDRESS:
SOUTH ROOSEVELT BLVD.
KEY WEST, FL 33040

SUB-CONSULTANT INFORMATION:

DDA ENGINEERS, P.A.
Consulting Engineers
4930 S.W. 74th Court
Miami, Florida. 33155
Phone: 305.666.0711
State of Florida - Authorization No.1306
website: www.ddaeng.com

PROFESSIONAL SEAL:

PEDRO J. DUQUESNE P.E. #22764

SUBMITTAL DESCRIPTION / MILESTONE:

BID SET
MAY 1st, 2017

REVISIONS:

1		

DRAWING SHEET INFORMATION

BA PROJECT NO.:

SCALE:

DATE:

DRAWING TITLE:
BATHROOM FOUNDATION AND GROUND FLOOR PLAN AND ROOF FRAMING PLAN.

SHEET NO.
S-1.01

GENERAL STRUCTURAL NOTES

1. GENERAL:

THE CONTRACTOR SHALL USE THE STRUCTURAL DRAWINGS TOGETHER WITH THE ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS TO LOCATE DEPRESSED SLABS, SLOPES, DRAINS, OUTLETS, RECESSES, OPENINGS, REGLETS, BOLT SETTINGS, SLEEVES, DIMENSIONS, ETC.. POTENTIAL CONFLICTS SHALL BE TRANSMITTED TO THE ARCHITECT AND ENGINEER BEFORE PROCEEDING WITH THE WORK. CONTRACTOR TO PROVIDE ADEQUATE TIME FOR RESPONSE FROM ARCHITECT/ENGINEER.

CONTRACTOR AGREES THAT HE WILL HOLD OWNER, ARCHITECT, ENGINEERS, AND/OR ANY OF THEIR EMPLOYEES OR AGENTS, HARMLESS FROM ANY AND ALL DAMAGE AND CLAIMS WHICH MAY ARISE BY REASON OF ANY NEGLIGENCE ON THE PART OF THE CONTRACTOR, OR ANY OF HIS SUBCONTRACTORS, OR ANY MATERIAL AND EQUIPMENT SUPPLIERS, AND/OR ANY OF THEIR EMPLOYEES OR AGENTS, IN THE PERFORMANCE OF THIS CONTRACT. IN CASE ANY ACTION IS BROUGHT AGAINST THE OWNER, OR ARCHITECT, OR ENGINEER, OR ANY OF THEIR EMPLOYEES OR AGENTS, CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR DEFENSE THEREOF, TO THE FULL SATISFACTION OF THE LATTER PARTY.

2. DESIGN LOADS:

ROOF: DEAD LOAD = 30 PSF, LIVE LOAD = 30 PSF

FLOOR: DEAD LOAD = 5 PSF, LIVE LOAD = 100 PSF

WIND LOADS AS PER ASCE 7/10: DESIGN WIND SPEED = 180 MPH, EXPOSURE CATEGORY = D, Kd = 0.85

DESIGN WIND PRESSURE ON ROOFING AS INDICATED ON THE DRAWINGS.

STRUCTURAL SYSTEM FOR THE BUILDING HAS BEEN DESIGNED IN ACCORDANCE WITH **THE FLORIDA BUILDING CODE, 2014 EDITION.**

SPECIALTY ENGINEER SHALL PROVIDE CALCULATIONS FOR THE ABOVE INDICATED LOADS

3.- SITE AND SOIL PREPARATION:

GENERAL CONTRACTOR MUST PERFORM THE SITE PREPARATION AND EXCAVATION WORK IN ACCORDANCE WITH THE RECOMMENDATIONS ON SOILS AND FOUNDATIONS INVESTIGATION PREPARED BY: NUTTING ENGINEERS, THE GEOTECHNICAL ENGINEERS FOR DEEP FOUNDATIONS. PRIOR TO FOUNDATION WORK. A COPY OF THE SOIL REPORT DATED: MAY 25, 2017 TO BE OBTAINED BY GENERAL CONTRACTOR FOR ANY ADDITIONAL INFORMATION PERTAINING THE FOUNDATIONS.

4.- FOUNDATIONS:

BASED ON SOIL BORINGS AND RECOMMENDATIONS MADE BY NUTTING ENGINEERS, THE FOUNDATIONS HAVE BEEN DESIGNED SUPPORTED ON 16"-ø AUGER CAST PILES, INSTALLED 15 FT DEEP REINFORCED WITH 8-#8 VERTICAL FULL LENGH AND #3 TIES AT 12" o.c.
COMPRESSION CAPACITY= 25 TONS
LATERAL CAPACITY= 10 TONS

GENERAL CONTRACTOR IS TO OBTAIN A COPY OF SOIL REPORT BY NUTTING ENGINEERS, DATED ON MAY 25, 2017 TO COMPLETE THE SOIL PREPARATION INSTRUCTIONS.

5. DEWATERING (IF APPLICABLE):

MUST EVACUATE ALL WATER FROM WITHIN FORMWORK BEFORE PLACEMENT OF ANY CONCRETE. AFTER DEWATERING AND BEFORE PLACING CONCRETE, MUST RINSE THE REINFORCING STEEL CLEAN OF ALL DELETERIOUS MATERIAL IF PREVIOUSLY LEFT SUBMERGED.

6. EXCAVATIONS:

GENERAL CONTRACTOR TO NOT EXCAVATE ADJACENT TO OR NEAR NEW STRUCTURES AFTER THEY HAVE BEEN CONSTRUCTED. EXCAVATIONS FOR UTILITIES ADJACENT TO OR NEAR NEW STRUCTURES TO BE COMPLETED BEFORE THE NEW STRUCTURES ARE CONSTRUCTED. COORDINATE ALL UTILITIES WITH STRUCTURAL DRAWINGS. IF CONFLICTS EXIST CONTACT ARCHITECT AND STRUCTURAL ENGINEER.

GENERAL CONTRACTOR TO EXERCISE CAUTION DURING EXCAVATIONS ADJACENT TO THE EXISTING STRUCTURES. IF THERE EXISTS A DEVIATION OF THE EXISTING FOUNDATION FROM WHAT IS SHOWN IN THESE PLANS, CONTACT ARCHITECT AND STRUCTURAL ENGINEER.

LATERAL SUPPORT, AND FOR MAINTAINING THE INTEGRITY OF THE EXISTING STRUCTURE DURING ALL PHASES OF THE CONSTRUCTION.

7. SLABS ON FILL:

FILL AND BACKFILL TO BE COMPACTED UNDER THE SUPERVISION OF A SPECIALTY ENGINEER TO A MINIMUM OF 95% OF MAXIMUM DRY DENSITY FOR ALL LAYERS AS VERIFIED BY FIELD DENSITY TESTS. TESTS SHALL BE MADE IN ACCORDANCE WITH METHODS OF TESTS FOR MOISTURE DENSITY RELATIONS OF SOILS, ASTM D-1557 MODIFIED TO USE 25 BLOWS ON FIVE LAYERS WITH A 10 POUND HAMMER DROPPING 18 INCHES. IN ADDITION, A MINIMUM OF ONE IN-PLACE FIELD DENSITY TEST SHALL BE PERFORMED FOR EACH 2500 SQUARE FEET, OR FRACTION THEREOF, FOR EACH LIFT OF COMPACTED SOIL, AND SUCH TESTING SHALL BE PERFORMED IN ACCORDANCE WITH EITHER ASTM D 1556, STANDARD TEST METHOD FOR DENSITY OF SOIL IN-PLACE BY THE SANDCONE± OR ASTM D 2922, STANDARD TEST METHODS FOR DENSITY OF SOIL AND SOIL AGGREGATE IN PLACE BY NUCLEAR METHODS OR OTHER APPROVED METHODS. COMPACTION LAYERS NOT TO EXCEED 12". BACKFILL MATERIAL TO BE APPROVED BY SOIL ENGINEER. SLABS TO BE PLACED CONTINUOUSLY, HOWEVER, MUST BE SAW CUT SAME DAY IT IS PLACED AND LIMITED TO 2000 S.F., AND 15 FEET IN ANY DIRECTION. PROVIDE VAPOR BARRIER BELOW ALL SLABS ON FILL (10 MIL.). REFER TO ARCHITECTURE FOR REQUIRED SOIL POISONING BENEATH ALL SLABS ON GRADE.

8. CONCRETE (SHOP DRAWINGS REQUIRED):

ALL CONCRETE TO ATTAIN A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 4,000 PSI IN 28 DAYS AND W/C RATIO OF Ø.5 AGGREGATES TO BE CLEAN AND WELL GRADED, MAXIMUM SIZE 1". CONCRETE SLUMP, 3" MIN. TO 5" MAX. VERTICAL CONCRETE DROP NOT TO EXCEED 8'.

9. CONCRETE TESTING:

AN INDEPENDENT TESTING LABORATORY, RETAINED BY THE CONTRACTOR, SHALL PERFORM THE FOLLOWING TESTS ON CAST-IN-PLACE CONCRETE.
ASTM C 143 "STANDARD TEST METHOD FOR SLUMP OF PORTLAND CEMENT CONCRETE"
ASTM C 39 "STANDARD TEST METHOD FOR COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE SPECIMENS".
ONE TEST SHALL BE PERFORMED ON EACH CLASS OF CONCRETE PER EVERY 50 CUBIC YARDS, OR FRACTION THEREOF, PLACED PER DAY. PER EACH TYPE OF CONCRETE MIX. A SET OF FIVE CYLINDERS SHALL BE TAKEN. THE SAMPLES SHALL BE TESTED AT AGE OF 3 DAYS (ONE), 7 DAYS (ONE), 28 DAYS (TWO) AND 56 DAYS (REMAINING SAMPLE SHALL BE TESTED ONLY IF 28-DAY OLD CONCRETE FAILED TO ATTAIN ITS SPECIFIED DESIGN STRENGTH).

10. REINFORCING STEEL (SHOP DRAWINGS REQUIRED)

TO BE NEW HIGH STRENGTH STEEL DEFORMED AS PER ASTM A 615, GRADE 60 (OR ASTM A 706 GRADE 60 WHERE WELDING IS ANTICIPATED). ALL REINFORCEMENT SHALL BE FREE OF SCALE, RUST OR OIL.
REINFORCING STEEL TO BE DETAILED AND FABRICATED IN ACCORDANCE WITH "MANUAL OF STANDARD PRACTICE OF DETAILING REINFORCING CONCRETE STRUCTURES", AND THE A.C.I. BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE ACI 318, LATEST EDITION. MECHANICAL OR WELDED SPLICES SHALL DEVELOP A MINIMUM OF 125 PERCENT OF THE SPECIFIED YIELD STRENGTH.

REQUIRED CLEAR CONCRETE COVER TO REINFORCEMENT

FOOTINGS	3"	2"	3"
GRADE BEAMS	3"	2"	2"
WALLS	---	---	1½"
COLUMNS	---	---	1½"
BEAMS	1½"	1½"	1½"
SLABS	1"	1"	1"

ALL REINFORCEMENT SHALL BE SUPPORTED ON CHAIRS (SLAB-ON-GRADE, FOOTING OR PILE CAP REINFORCEMENT MAY BE SUPPORTED ON CONCRETE BRICKS). PROVIDE FULL TENSION SPLICE AT ALL REINFORCEMENT NOTED ON DRAWINGS AS CONTINUOS. UNLESS DRAWINGS SPECIFICALLY CALL FOR HEAVIER REINFORCEMENT, FREE EDGES OF ALL CONCRETE SLABS (SLABS-ON-GRADE, REINFORCED OR POST-TENSIONED SLABS, STAIR SLABS, ETC.) SHALL BE REINFORCED WITH (1)#4 CONT. TOP AND BOTTOM.

11. WELDED WIRE FABRIC:

SHALL CONFORM TO ASTM A 185 AND BE FREE OF SCALE, RUST OR OIL. SPLICE SHEETS ONE-AND-A-HALF SPACE LENGTHS (MINIMUM).

12. WEATHER RESISTANCE:

TOP OF FLAT CONCRETE SURFACES REMAINING EXPOSED TO THE ELEMENTS THROUGHOUT THE LIFE OF THE STRUCTURE ARE TO BE TREATED WITH A CLEAR, NON-FLAMMABLE PENETRATING SEALER (SONNEBORN PENETRATING SEALER 20, HYDROZO ENVIROSEAL 20 OR AN ENGINEER APPROVED SUBSTITUTE). COORDINATE WITH ARCHITECT PRIOR TO INSTALLATION (COMPATILIBITY WITH FINISHES).

13. PENETRATIONS:

UNLESS CLEARLY SHOWN ON STRUCTURAL DRAWINGS, NO PENETRATIONS SHALL BE MADE IN ANY STRUCTURAL MEMBER WITHOUT A PRIOR WRITTEN APPROVAL OF THE STRUCTURAL ENGINEER. IT SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO IDENTIFY SUCH PENETRATIONS BASED ON INFORMATION PROVIDED BY ALL SUBCONTRACTORS AND TO SUBMIT DETAILED AND DIMENSIONED FLOOR PLANS TO THE STRUCTURAL ENGINEER FOR REVIEW AND APPROVAL PRIOR TO IMPLEMENTATION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ANY LABOR AND MATERIALS ASSOCIATED WITH ADDITIONAL REINFORCEMENT OF STRUCTURAL MEMBERS RESULTING FROM INTRODUCTION OF SUCH PENETRATIONS.

14. DETAILS AND SECTIONS:

ALL DETAILS AND SECTIONS SHOWN ON THE DRAWINGS ARE INTENDED TO BE TYPICAL, AND SHALL BE CONSTRUED TO APPLY TO ANY SIMILAR SITUATION ELSEWHERE ON THE PROJECT, UNLESS A DIFFERENT DETAIL, OR SECTION, IS SHOWN.

15. WINDOWS/SLIDING DOORS/LOUVERS (SHOP DRAWINGS REQUIRED):

WINDOWS/SLIDING DOORS/LOUVERS WITH CONNECTIONS TO THE STRUCTURE SHALL BE DESIGNED BY THE SPECIALTY ENGINNER FOR LOADS AS PER THE FLORIDA BUILDING CODE (WITH CALCULATIONS), SHALL INCLUDE PLANS AND DETAILS CLEARLY INDICATING DESIGN LOADS, MATERIALS USED, FINISHES, FASTENERS AS WELL AS LOADS IMPOSED BY THE WINDOW/SLIDING GLASS DOOR/LOUVER ON THE STRUCTURE. SIDES OF ALL SLIDING GLASS DOORS AND FULL-HEIGHT WINDOWS SHALL BE DESIGNED AS MULLIONS AND BE CAPABLE OF SPANNING FULL-HEIGHT WITHOUT ASSISTANCE FROM ADJACENT CONCRETE/MASONRY (ALTHOUGH SUCH MULLIONS MAY BE DETAILED AS FASTENED TO SIDES OF OPENINGS).

16. ANCHORING ADHESIVES:

ADHESIVE ANCHORS FOR USE IN CONCRETE SHALL:

A) HAVE BEEN QUALIFIED IN ACCORDANCE WITH ACI 355.4 AND ICC-ES AC308 FOR CRACKED AND UN-CRACKED CONCRETE RECOGNITION.

B) BE INSTALLED IN CONCRETE HAVING A MINIMUM AGE OF 21 DAYS PER ACI 318-11 D.22.

C) BE INSTALLED IN DRY HOLES THAT ARE 1/8" LARGER THAN THE DIAMETER OF THE REINFORCING STEEL OR THREADED ROD UNLESS OTHERWISE NOTED IN THESE PLANS, OR UNLESS OTHERWISE NOTED IN THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS (MPII).

D) HAVE A MAXIMUM IN-SERVICE SHORT-TERM TEMPERATURE OF 150°F, AND MAXIMUM IN-SERVICE LONG-TERM TEMPERATURE OF 110°F (ACI 318-11 D.9.2.1).
FOR ANCHORING REINFORCING STEEL OR THREADED ROD IN EXISTING CONCRETE USE "HIT-HY 200" BY HILTI, "SET-XP" OR "AT-XP" BY SIMPSON, OR EQUAL. OTHER AVAILABLE ADHESIVES ARE MADE BY ITW/RED HEAD, ULTRA BOND OR POWERS FASTENERS. DRILLED HOLES SHALL BE CLEANED BEFORE DISPENSING THEADHESIVE PER THE MPII. ADHESIVE ANCHORS INSTALLED IN HORIZONTAL OR UPWARDLY INCLINED ORIENTATIONS RESISTING SUSTAINED TENSION LOADS SHALL BE INSTALLED BY PERSONNEL CERTIFIED BY AN APPLICABLE CERTIFICATION PROGRAM IN ACCORDANCE WITH ACI/CRSI ADHESIVE ANCHOR INSTALLER CERTIFICATION PROGRAM, OR EQUIVALENT, AND SHALL REQUIRE CONTINUOS SPECIAL INSPECTION (ACI 318-11 D.9.2.2 AND D.9.2.4.).

17. EXPANSION BLOTS:

EXPANSION BOLTS FOR USE IN CONCRETE SHALL:
A) HAVE BEEN QUALIFIED IN ACCORDANCE WITH ACI 355.2 AND ICC-ES AC193 FOR CRACKED AND UN-CRACKED CONCRETE RECOGNITION.
B) BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS (MPII).
EXPANSION BOLTS NOTED IN PLANS SHALL BE "KWIK BOLT TZ" BY HILTI, "STRONG-BOLT 2" BY SIMPSON OR EQUAL. FOR SUBSTITUTION, SUBMIT TO STRUCTURAL ENGINEER FOR REVIEW AND APPROVAL.

18. HEAVY DUTI SCREW ANCHORS:

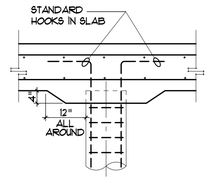
SCREW ANCHORS FOR USE IN CONCRETE SHALL:
A) HAVE BEEN QUALIFIED IN ACCORDANCE WITH ICC-ES AC193 FOR CRACKED AND UN-CRACKED CONCRETE RECOGNITION.
B) BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS (MPII).
SCREW ANCHORS NOTED IN PLANS SHALL BE "KWIK HUS-EZ" BY HILTI, "TITEN HD" BY SIMPSON OR EQUAL. FOR SUBSTITUTION, SUBMIT TO STRUCTURAL ENGINEER FOR REVIEW AND APPROVAL.

19. SHOP DRAWINGS:

NO SHOP DRAWING SHALL BE SUBMITTED FOR ARCHITECT/ENGINEER'S REVIEW UNTIL AFTER THEY HAVE BEEN REVIEWED AND NOTED FOR CONSTRUCTION METHOD, DIMENSIONING, AND OTHER TRADE REQUIREMENTS BY THE CONTRACTOR, AND STAMPED WITH THE CONTRACTOR'S APPROVAL SEAL. ENGINEER ASSUMES NO RESPONSIBILITY FOR DIMENSIONS, QUANTITIES, ERRORS OR OMISSIONS, AS A RESULT OF CHECKING AND REVIEWING ANY SHOP DRAWINGS. ANY ERRORS OR OMISSIONS MUST BE MADE GOOD BY CONTRACTOR, IRRESPECTIVE OF RECEIPT, CHECKING OR REVIEW OF DRAWINGS BY ENGINEER, AND EVEN THOUGH WORK IS DONE IN ACCORDANCE WITH SUCH SHOP DRAWINGS.

20. SPECIALTY ENGINEER ITEMS ON THIS PROJECT INCLUDE:

-PRECAST CONCRETE STRUCTURE (MODULAR BATHROOM)



TYPICAL PILE CAP DETAIL
A DETAIL
S-2.01 SCALE: 3/4"=1'-0"

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PROJECT NAME:
SMATHERS BEACH BATHROOM BUILDING

PROJECT LOCATION/ADDRESS:
SOUTH ROOSEVELT BLVD.
KEY WEST, FL 33040

SUB-CONSULTANT INFORMATION:

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PROFESSIONAL SEAL:

PEDRO J. DUQUESNE P.E. #22764

SUBMITTAL DESCRIPTION / MILESTONE:

BID SET
MAY 1st, 2017

REVISIONS:

1		

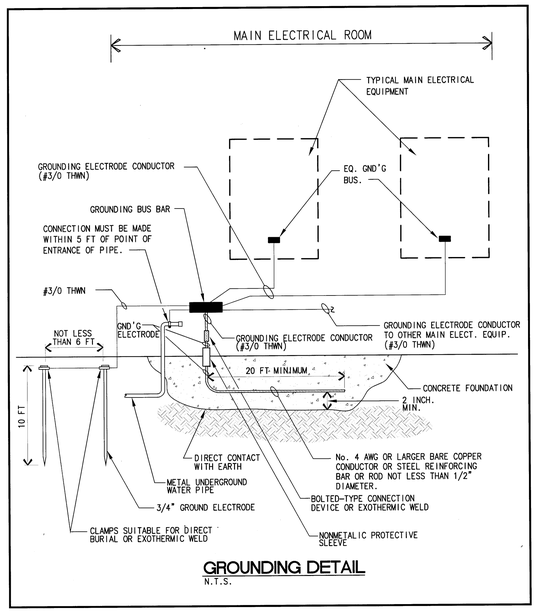
DRAWING SHEET INFORMATION

BA PROJECT NO.: 14041
SCALE: 1" = 20'-0"
DATE:

DRAWING TITLE:
GENERAL STRUCTURAL NOTES.

SHEET NO.
S-2.01

PEDRO J. DUQUESNE, P.E.
FL. ENGINEER REG. NO. 22764



GROUNDING DETAIL
N.T.S.

LEGEND

SYMBOL	DESCRIPTION
CPP □	EXISTING KEYS ENERGY POWER POLE
— — —	UNDERGROUND WIRING.
A.F.G.	ABOVE FINISH GRADE.
▬	PRE-FAB BATHROOM PANEL
▯D	KEYS ENERGY SINGLE PHASE METER
U.O.N.	UNLESS OTHERWISE NOTED.
WP/WR	WEATHER PROOF LOCKABLE WHILE IN USE COVER WITH WEATHER RESISTANT DEVICE.

GENERAL ELECTRICAL NOTES

1.a) ALL WORK SHALL BE IN ACCORDANCE WITH THE CURRENT ADOPTED EDITION OF THE NATIONAL ELECTRICAL CODE, FLORIDA BUILDING CODE AND OTHER APPLICABLE CODES AND STANDARDS.

1.b) IT IS THE CONTRACTORS RESPONSIBILITY TO BE FULLY COGNIZANT WITH ALL CODE SECTIONS AS THEY APPLY TO THE WORK/INSTALLATION AT HAND WHETHER OR NOT SHOWN ON THE DRAWINGS BUT REQUIRED BY CODE. IF ANY DISCREPANCY ARISES BETWEEN ANY DESIGN ISSUES AND CODE REQUIREMENTS, CONTRACTOR MUST ADHERE TO THE MOST STRINGENT APPROACH.

2.a) THE DRAWINGS ARE DIAGRAMMATIC AND DO NOT SHOW ALL OFFSETS, BENDS AND BOXES REQUIRED TO MAKE A COMPLETE NEAT INSTALLATION IN ACCORDANCE WITH N.E.C.

3. THE CONTRACTOR IS RESPONSIBLE FOR EVALUATING FIELD CONDITIONS BY VISITING THE SITE PRIOR TO COMMENCING/BIDDING WORK.

4. CONTRACTOR IS RESPONSIBLE FOR FURNISHING AND INSTALLING ALL ELECTRICAL SYSTEM COMPONENTS SUCH AS LUMINAIRES, WIRING DEVICES AND CONTROLS SHOWN ON THE ELECTRICAL DRAWINGS.

5. THE CONTRACTOR SHALL SATISFACTORILY REPAIR/REPLACE EQUIPMENT OR PART OF STRUCTURE DAMAGED AS A RESULT OF HIS WORK. SURFACES AND FINISHED AREAS SHALL BE RESTORED TO MATCH ADJACENT AREAS.

6. APPROVAL SHALL BE OBTAINED FROM THE STRUCTURAL ENGINEER PRIOR TO CUTTING OR DRILLING ANY STRUCTURAL SUPPORT MEMBER.

7. ALL DEVICES INSTALLED OUTDOORS TO HAVE WEATHERPROOF WHILE IN USE COVERS.

8. WIRE SIZE SHALL BE #12 THHN/THWN UNLESS OTHERWISE NOTED ON PLANS. CONDUCTORS #6 AND LARGER SHALL BE THHN.

9. ALL CONDUCTORS SHALL BE COPPER.

10. ALL CONDUCTORS SHALL BE RUN IN CONDUIT (METALLIC TYPE). IF PVC SCHEDULE 40 IS USED FOR UNDERGROUND FEEDERS ONLY, AN EQUIPMENT GROUND CONDUCTOR SIZED IN ACCORDANCE WITH N.E.C. 250-122 MUST BE INSTALLED AND CONDUIT SIZE INCREASED AS REQUIRED.

11. ALL MATERIALS SHALL BE U. L. APPROVED.

12. NEW TYPEWRITTEN PANEL SHALL BE FURNISHED AFTER JOB IS COMPLETED REFLECTING ALL CHANGES AND ADDITIONS.

13. ALL BRANCH CIRCUITS SHALL BE PROPERLY PHASE BALANCED.

14. ALL WIRING DEVICES TO BE COMMERCIAL GRADE WITH HEAVY DUTY WEATHERPROOF COVERS. PROVIDE MANUFACTURERS LEVITON, HUBBELL AND BRYANT.

15. ALL BRANCH CIRCUITS TO HAVE A GREEN EQUIPMENT GROUNDING CONDUCTOR SIZED AS PER N.E.C. 250.122.

16. ALL EMPTY CONDUITS TO BE PROVIDED WITH NYLON PULL STRINGS.

17. FUSES SHALL BE DUAL ELEMENT, TIME DELAY TYPE UNLESS OTHERWISE NOTED.

18. ALL SAFETY SWITCHES TO BE HEAVY DUTY TYPE.

19. RISERS ARE DIAGRAMMATIC ONLY. THEY DO NOT SHOW EVERY BEND REQUIRED FOR THE INSTALLATION.

20. THIS DRAWING IS A GUIDE FOR THE INSTALLATION OF ELECTRICAL SERVICE. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE TO PROVIDE A FUNCTIONING SYSTEM.

21. ALL PULL AND JUNCTION BOXES SHALL BE ACCESSIBLE AT ALL TIMES.

22. EXACT POINT AND METHODS OF CONNECTION SHALL BE DETERMINED IN FIELD.

23. ALL WORK SHALL BE DONE IN A NEAT AND WORKMANLIKE MANNER.

24. BRANCH CIRCUIT BREAKERS SHALL BE OF THE BOLT-ON TYPE. PLUG-IN CIRCUIT BREAKERS WILL NOT BE ACCEPTED.

25. INSULATED CONDUCTORS SYSTEM SHALL BE COLOR CODED AS FOLLOWS:

120/240V SYSTEM	
PHASE 'A'	BLACK
PHASE 'B'	RED
NEUTRAL	WHITE
GROUND	GREEN

26. ALL EXTERIOR SURFACE MOUNTED LUMINAIRES, POSTS, POST TOPS, POLES AND AREA LIGHTING LUMINAIRES TO HAVE FINISH COLOR TO AS SPECIFIED BY ARCHITECT.

27. ALL PULL BOXES, HAND HOLES AND MAN HOLES TO HAVE COVER PLATE BOLTED TO FRAME AND BONDED TO THE EQUIPMENT GROUND SYSTEM.

28. CONTRACTOR SHALL INCLUDE IN HIS BID ALL COSTS RELATED TO THE FBC WIND LOAD COMPLIANCE, THE CERTIFICATION OF THE EXTERIOR POLE/LUMINAIRE ASSEMBLIES BY A STRUCTURAL ENGINEER.

29. ALL CONDUCTOR SPLICES IN EXTERIOR LOCATED JUNCTION/PULL BOXES EXPOSED TO THE WEATHER TO BE WEATHER SEALED BY USING AN APPROVED METHOD SUBMERSIBLE SPLICING CONNECTORS.

30. WHEN THERE IS CONFLICT AS TO OPTIONS TO PERFORM A GIVEN TASK CONTRACTOR SHALL CHOOSE THE MOST COSTLY IN NATURE IN ORIGINAL BID.

31. WHEN ITEMS ARE REQUIRED BY LOCAL OR NATIONAL CODES CONTRACTOR SHALL INCLUDE THEM WHETHER SHOWN ON THE DRAWINGS OR NOT.

32. ALL 120V BRANCH CIRCUITS SHALL BE INSTALLED WITH INDIVIDUAL NEUTRAL CONDUCTORS PER PHASE UNLESS INSTALLED AS PER METHOD ON NOTE #46B.

33. IF MULTIWIRE BRANCH CIRCUITS (TWO OR THREE POLE BRANCH CIRCUITS SHARING A COMMON NEUTRAL CONDUCTOR) ARE INSTALLED AT CONTRACTOR'S OPTION, ALL UNGROUNDED CONDUCTORS SHALL BE SIMULTANEOUSLY DISCONNECTED BY PROVIDING 2 POLE OR 3 POLE CIRCUIT BREAKER OR SINGLE POLE BREAKERS WITH APPROVED HANDLE TIES AS REQUIRED PER N.E.C. 210.4.

34. ALL FEEDERS SHALL BE SIZED AND INSTALLED WITH A MAXIMUM VOLTAGE DROP OF 2%. ALL BRANCH CIRCUIT BREAKERSSHALL BE SIZED IN STALLED WITH A MAXIMUM VOLTAGE DROP OF 3%

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PROJECT NAME:
SMATHERS BEACH RESTROOM

PROJECT LOCATION/ADDRESS:
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May 1st, 2017

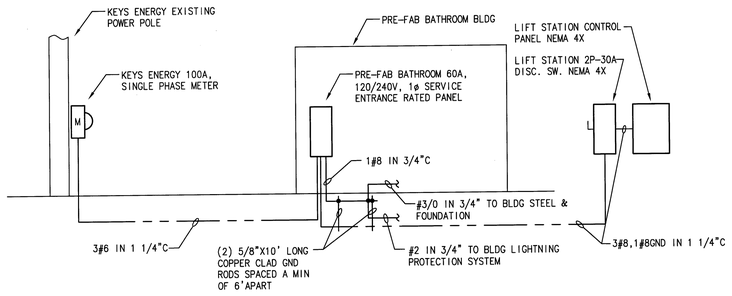
REVISIONS:

△		

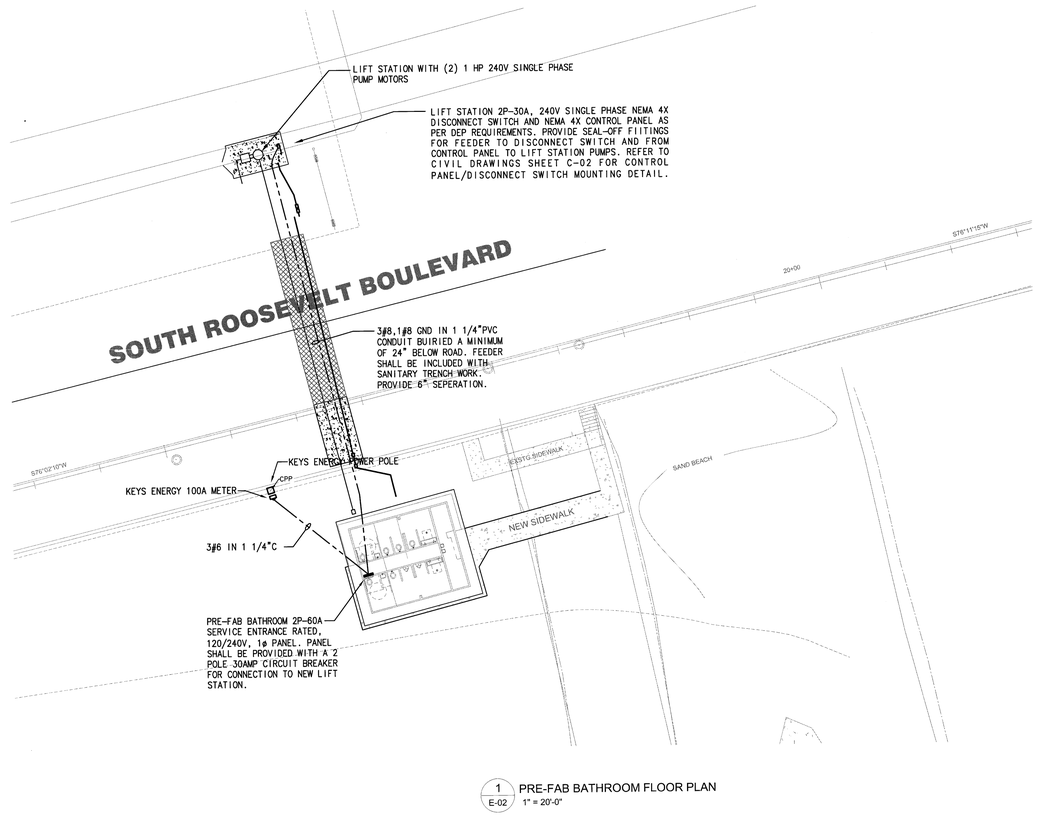
DRAWING SHEET INFORMATION
BA PROJECT NO.: 14041
SCALE: As indicated
DATE:

DRAWING TITLE:
GENERAL NOTES LEGEND & DETAILS

SHEET NO.
E-00



1 / E-02 POWER RISER DIAGRAM
NTS



1 / E-02 PRE-FAB BATHROOM FLOOR PLAN
1" = 20'-0"

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PROJECT NAME:
SMATHERS BEACH RESTROOM

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SUBMITTAL DESCRIPTION / MILESTONE:

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May 1st, 2017

REVISIONS:

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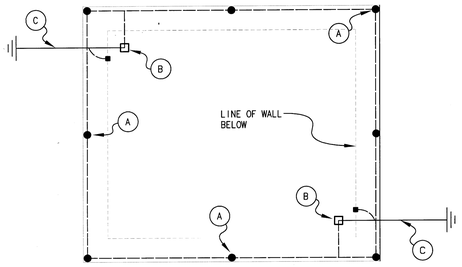
DRAWING SHEET INFORMATION

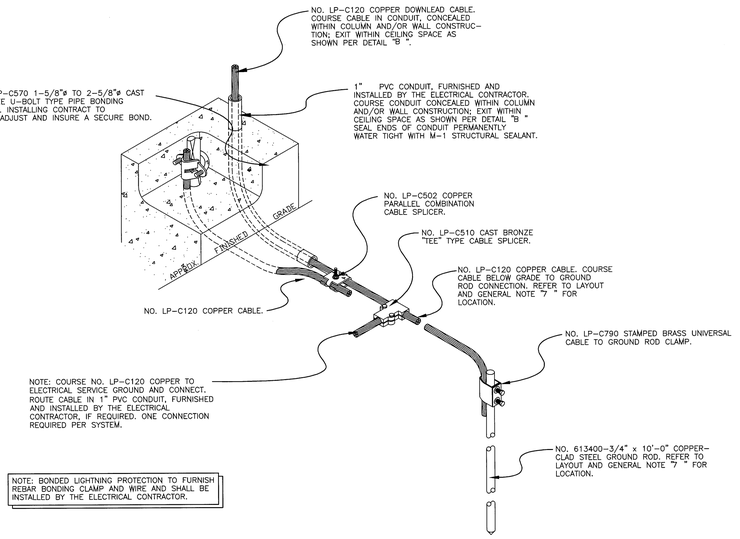
BA PROJECT NO.:	14041
SCALE:	As indicated
DATE:	

DRAWING TITLE:
PRE-FAB BATHROOM SITE PLAN & RISER DIAGRAM

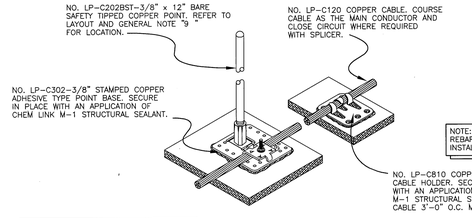
SHEET NO.
E-01



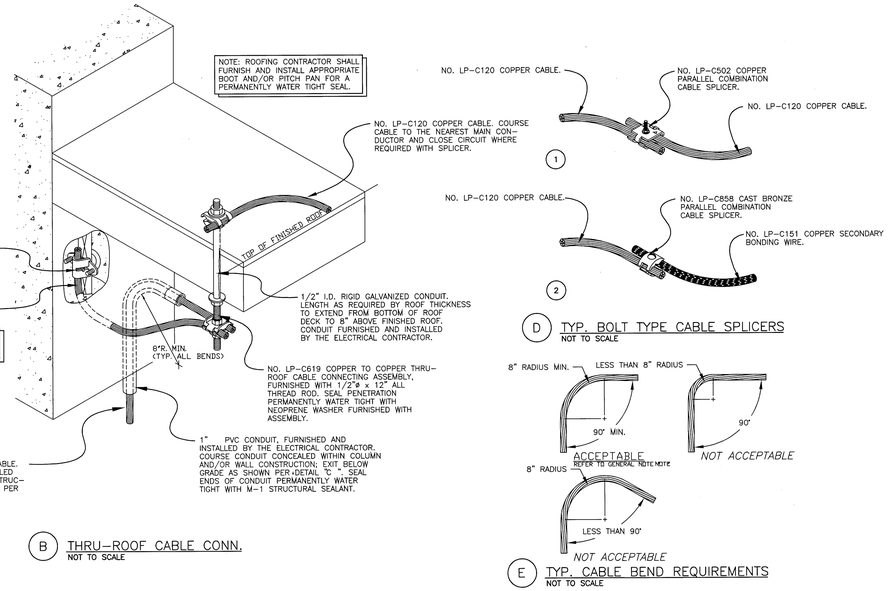
1 E-02 PRE-FAB BATHROOM LIGHTNING PROTECTION LAYOUT
1/8" = 1'-0"



C CONCEALED DOWNLEAD TO GROUNDING CONN.
NOT TO SCALE



A ADHESIVE AIR TERMINAL
NOT TO SCALE



B THRU-ROOF CABLE CONN.
NOT TO SCALE

D TYP. BOLT TYPE CABLE SPLICERS
NOT TO SCALE

E TYP. CABLE BEND REQUIREMENTS
NOT TO SCALE

GENERAL INSTALLATION NOTES

1	CURRENT U.L. LISTED TVSS/SPD ARE REQUIRED ON ALL SERVICE ENTRANCES AND SHALL BE FURNISHED AND INSTALLED BY OTHERS.
2	TELEPHONE AND/OR ELECTRICAL SERVICE ENTRANCE GROUNDS SHALL BE INTERCONNECTED TO ONE LIGHTNING PROTECTION GROUND OR WATER PIPE.
3	METAL BODIES OF INDUCTANCE LOCATED ABOUT THE ROOF SUCH AS; METAL FLASHING, GRAVEL STOPS, ROOF DRAINS, SOIL PIPE VENTS, INSULATION VENTS, LOUVERS AND DOOR FRAMES SITUATED WITHIN 6'-0" OF A LIGHTNING CONDUCTOR OR BONDED METAL BODY SHALL BE INTERCONNECTED TO THE LIGHTNING CONDUCTOR SYSTEM.
4	NO BEND OF A CONDUCTOR SHALL FORM A FINAL INCLUDED ANGLE OF LESS THAN 90° NOR SHALL HAVE A RADIUS OF BEND OF LESS THAN 8".
5	CONDUCTORS SHALL INTERCONNECT ALL AIR TERMINALS AND SHALL FORM A TWO-WAY PATH FROM EACH AIR TERMINAL HORIZONTALLY OR DOWNWARD TO CONNECTIONS WITH GROUND TERMINALS.
6	ALL LIGHTNING PROTECTION CONDUCTORS SHALL BE FASTENED NOT MORE THAN 3'-0" MAXIMUM SPACING.
7	GROUND RODS SHALL BE DRIVEN TO A MINIMUM DEPTH OF 10'-0" BELOW GRADE AND 2'-0" AWAY FROM FOUNDATION WALL.
8	FOR SAKE OF CLARITY, WE HAVE NOT LABELED EACH INDIVIDUAL ITEM OF LIGHTNING PROTECTION MATERIALS ON THE ROOF PLAN. WE HAVE SHOWN INSTALLATION DETAILS AND HAVE CALLED OUT EACH OF THESE DETAILS ON THE ROOF PLAN ONLY AT RANDOM LOCATIONS.
9	AIR TERMINALS SHALL BE PLACED AT ALL UNPROTECTED OUTSIDE CORNERS AND LOCATED INTERMEDIATELY ON 20'-0" MAXIMUM SPACING AROUND THE ROOF PERIMETER OR RIDGE AND WITHIN 2'-0" OF OUTSIDE EDGE.
10	BOND ALL METALLIC PIPES INCLUDING WATER, FIRE, GAS, SEWER, STORM, ETC. WHICH ENTER THE STRUCTURE TO THE NEAREST DOWNLEAD, GROUND ROD OR GROUND LOOP.
11	BARE COPPER LIGHTNING PROTECTION MATERIALS SHALL NOT BE INSTALLED ON ALUMINUM ROOF OR SIDING OR OTHER ALUMINUM SURFACES AND VICE VERSA. ALUMINUM LIGHTNING PROTECTION MATERIALS SHALL NOT BE INSTALLED ON COPPER ROOFING OR COPPER SIDING OR OTHER COPPER SURFACES.
12	THE LIGHTNING PROTECTION SYSTEM SHALL BE INSTALLED IN A NEAT AND INCONSPICUOUS MANNER SO THAT ALL COMPONENTS WILL BLEND IN WITH THE APPEARANCE OF THE BUILDING.
13	ACTUAL JOB-SITE CONDITIONS MAY NECESSITATE SLIGHT ALTERATIONS IN AIR TERMINAL AND GROUND ROD LOCATIONS.
14	MIDROOF AIR TERMINALS SHALL BE PLACED ON 50'-0" MAXIMUM SPACING.
15	IF REQUIRED, ANY SACRIFICIAL ROOFING PADS, SHALL BE FURNISHED AND INSTALLED BY THE ROOFING CONTRACTOR.
16	ALL ADHESIVE TYPE FITTINGS SHALL BE SET IN PLACE WITH AN APPLICATION OF CHEM LINK M-1 STRUCTURAL SEALANT ON NON-BALISTED ROOFS.
17	SEAL ENDS OF CONDUIT MOISTURE TIGHT WITH M-1 STRUCTURAL SEALANT.
18	ALL CONDUIT, CONDUIT FASTENERS AND MISCELLANEOUS ACCESSORIES SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR.
19	ALL REINFORCING, STRUCTURAL, FRAMING AND MISCELLANEOUS STEEL SHALL BE MADE ELECTRICALLY CONTINUOUS THROUGHOUT CONSTRUCTION BY WELDING, CLIPPING, BOLTING OR OTHER APPROVED METHODS.
20	THE DESIGN LAYOUT AND INSTALLATION DETAILS SHOWN HEREON SHALL MEET THE REQUIREMENTS OF UNDERWRITERS' LABORATORIES STANDARD 96A FOR LIGHTNING PROTECTION SYSTEMS WHEN REQUIRED BY SPECIFICATION.
21	THE DESIGN LAYOUT AND INSTALLATION DETAILS SHOWN HEREON SHALL MEET THE REQUIREMENTS OF NATIONAL FIRE PROTECTION ASSOCIATION STANDARD #780, CURRENT EDITION WHEN REQUIRED BY SPECIFICATION.
22	THE LIGHTNING PROTECTION INSTALLATION SHALL COMPLY IN ALL RESPECTS TO THE LIGHTNING PROTECTION INSTITUTE STANDARD 175 WHEN REQUIRED BY SPECIFICATION. THE INSTALLATION SHALL BE MADE BY OR UNDER THE SUPERVISION OF AN L.P.I. MASTER INSTALLER DESIGNER.
23	THE DESIGN LAYOUT AND INSTALLATION SHOWN HEREON SHALL RECEIVE AN LPI 175 CERTIFICATION FROM THE LPI-IP (INSPECTION PROGRAM) OR UL 96A MASTER LABEL CERTIFICATE WHEN REQUIRED BY SPECIFICATION, UPON COMPLETION OF THE PROJECT.

NOTE: THE DESIGN LAYOUT AND INSTALLATION PROCEDURES SHOWN FOR THE BUILDING LIGHTNING PROTECTION SYSTEM AND THE COMPONENT PARTS SHOWN HEREON ARE ILLUSTRATED AS A STANDARD OF QUALITY BY BONDED LIGHTNING PROTECTION
2080 W. INDIANTOWN ROAD, JUPITER, FLORIDA 33458.
PHONE:561-746-4336 FAX:561-747-8233

LEGEND

●	AIR TERMINAL LOCATION
□	THRU-ROOF LOCATION
€	THRU-WALL LOCATION
	REBAR BOND PROVIDED BY BONDED LIGHTNING PROTECTION AND INSTALLED BY THE ELECTRICAL CONTRACTOR.
	GROUND ROD LOCATION
	NO. LP-C120 COPPER CABLE, U.L. LABELED, 29 ST., 17 GA. 192 LBS./1,000 FT., 59,450 CM. (#2 AWG).
	NO. LP-C120 COPPER CABLE, U.L. LABELED, SAME SPECS AS ABOVE. COURSE CABLE CONCEALED FROM VIEW SHOWN.
⊗	ROOF DRAIN
⊘	OVERFLOW DRAIN

BERMELLO AJAMIL & PARTNERS INC
Architecture • Engineering • Planning
Interior Design • Landscape Architecture
2601 South Bayshore Drive
Suite 1000
Miami, Florida 33133
(305) 859-2050
Fax (305) 860-3700

PREPARED FOR/OWNER:
CITY OF KEY WEST, FL
P .O. BOX 1409
3140 FLAGLER AVENUE
KEY WEST, FL 33041

PROJECT NAME:
SMATHERS BEACH RESTROOM

PROJECT LOCATION/ADDRESS:
SOUTH ROOSEVELT BLVD.
KEY WEST, FL 33040

HUFSEY,NICOLAIDES,GARCIA & SUAREZ CONSULTING ENGINEERS
4800 S.W. 74th Court. Miami, Florida 33155
(305) 270-9935 Fax (305) 665-5891
HNGS # 16-0062
☐ ENRIQUE J. SUAREZ, P.E. (MECHANICAL) FL REG.#0015794
☐ CARLOS GARCIA, P.E. (ELECTRICAL) FL REG.#0014104

PROFESSIONAL SEAL:
ANTHONY A. SCHULZ LICENSE No 60762 STATE OF FLORIDA PROFESSIONAL ENGINEER
ANTHONY A. SCHULZ, P.E. (ELECTRICAL)
FL REG.#0060762

SUBMITTAL DESCRIPTION / MILESTONE:

BID SET
May 1st, 2017

REVISIONS:
△

DRAWING SHEET INFORMATION
BA PROJECT NO.: 14041
SCALE: As indicated
DATE:

DRAWING TITLE:
LIGHTNING PROTECTION SHEET

SHEET NO.
E-02

PART 7

FDOT UTILITY PERMIT

UTILITY PERMIT

PERMIT NO.: 2017-H-692-3	**SECTION NO.:** 90003000	**STATE ROAD** A1A	**COUNTY** MONROE
FDOT construction is proposed or underway.	☐ **Yes**	☒ **No**	**Financial Project ID**:
Is this work related to an approved Utility Work Schedule?	☐ **Yes**	☒ **No**	**If yes, Document Number**:
PERMITTEE:	City of Key West		
ADDRESS:	1300 White Street	**TELEPHONE NUMBER**: (305) 809-3962	
CITY/STATE/ZIP:	Key West, FL 33040		

The above PERMITTEE requests permission from the State of Florida Department of Transportation, hereinafter called the FDOT, to construct, operate and maintain the following: Open trench construction (as approved by Nathan Pulido, FDOT South Roosevelt Blvd Project Manager) to install parallel sanitary ... (see cont. page)

FROM:	**TO**:

Submitted for the PERMITTEE by: Name and Company (Typed or Printed Legibly)	**Contact Information Address/Telephone/E-Mail (if applicable)**	**Signature**	**Date**
JAMES BOUQUET		JAMES BOUQUET (sig)	01/31/2017

1. The Permittee declares that prior to filing this application, the location of all existing utilities that it owns or has an interest in, both aerial and underground, are accurately shown on the plans and a letter of notification was mailed on 01/11/2017 to the following utilities known to be involved or potentially impacted in the area of the proposed installation:
   KEYS Energy Services.
2. The local Maintenance or Resident Engineer, hereafter referred to as the FDOT Engineer, shall be notified a minimum of forty eight (48) hours in advance prior to starting work and again immediately upon completion of work. The FDOT's Engineer is Ali Al-Said, located at 1000 NW 111th Avenue Miami, FL 33172, Telephone Number (305) 470-5356.
   The Permittee's employee responsible for MOT is _____,
   Telephone Number _____ (This name may be provided at the time of the forty eight (48) hour advance notice prior to starting work).
3. All work, materials, and equipment shall be subject to inspection and approval by the FDOT Engineer.
4. All plans and installations shall conform to the requirements of the FDOT's UAM in effect as of the date this permit is approved by FDOT, and shall be made a part of this permit. This provision shall not limit the authority of the FDOT under Paragraph 8 of this Permit.
5. This Permittee shall commence actual construction in good faith within 60 days after issuance of permit, and shall be completed within 180 days after the permitted work has begun. If the beginning date is more than sixty (60) days from the date of permit approval, the Permittee must review the permit with the FDOT Engineer to make sure no changes have occurred to the Transportation Facility that would affect the permitted construction.
6. The construction and maintenance of such utility shall not interfere with the property and rights of a prior Permittee.
7. It is expressly stipulated that this permit is a license for permissive use only and that the placing of utilities upon public property pursuant to this permit shall not operate to create or vest any property right in said holder, except as provided in executed subordination and Railroad Utility Agreements.
8. Pursuant to Section 337.403, Florida Statutes, any utility placed upon, under, over, or along any public road or publicly owned rail corridor that is found by FDOT to be unreasonably interfering in any way with the convenient, safe, or continuous use, or maintenance, improvement, extension, or expansion, of such public road or publicly owned rail corridor shall, upon thirty (30) days written notice to the utility or its agent by FDOT, be removed or relocated by such utility at its own expense except as provided in Section 337.403(1), Florida Statutes, and except for reimbursement rights set forth in previously executed subordination and Railroad Utility Agreements, and shall apply to all successors and assigns for the permitted facility.
9. It is agreed that in the event the relocation of said utilities are scheduled to be done simultaneously with the FDOT's construction work, the Permittee will coordinate with the FDOT before proceeding and shall cooperate with the FDOT's contractor to arrange the sequence of work so as not to delay the work of the FDOT's contractor, defend any legal claims of the FDOT's contractor due to delays caused by the Permittee's failure to comply with the approved schedule, and shall comply with all provisions of the law and the FDOT's current UAM. The Permittee shall not be responsible for delay beyond its control.
10. In the case of non-compliance with the FDOT's requirements in effect as of the date this permit is approved, this permit is void and the facility will have to be brought into compliance or removed from the R/W at no cost to the FDOT, except for reimbursement rights set forth in previously executed subordination and Railroad Utility Agreements. This provision shall not limit the authority of the FDOT under Paragraph 8 of this Permit.
11. It is understood and agreed that the rights and privileges herein set out are granted only to the extent of the State's right, title and interest in the land to be entered upon and used by the Permittee, and the Permittee will, at all times, and to the extent permitted by law, assume all risk of and indemnify, defend, and save harmless the State of Florida and the FDOT from and against any and all loss, damage, cost or expense arising in any manner on account of the exercise or attempted exercises by said Permittee of the aforesaid rights and privileges.
12. During construction, all safety regulations of the FDOT shall be observed and the Permittee must take measures, including placing and the display of safety devices that may be necessary in order to safely conduct the public through the project area in accordance with the Federal MUTCD, as amended by the UAM.
13. Should the Permittee be desirous of keeping its utilities in place and out of service, the Permittee, by execution of this permit acknowledges its present and continuing ownership of its utilities located between _____
    and _____
    within the FDOT's R/W as set forth above. Whenever the Permittee removes its facilities, it shall be at the Permittee's sole cost and expense. The Permittee, at its sole expense, shall promptly remove said out of service utilities whenever the FDOT determines said removal is in the public interest.
14. In the event contaminated soil is encountered by the Permittee or anyone within the permitted construction limits, the Permittee shall immediately cease work and notify the FDOT. The FDOT shall notify the Permitee of any suspension or revocation of the permit to allow contamination assessment and remediation. Said suspension or revocation shall remain in effect until otherwise notified by FDOT
15. For any excavation, construction, maintenance, or support activities performed by or on behalf of the FDOT, within its R/W, the Permittee may be required by the FDOT or its agents to perform the following activities with respect to a Permittee's facilities: physically expose or direct exposure of underground facilities, provide any necessary support to facilities and/or cover, de-energize or alter aerial facilities as deemed necessary for protection and safety.

UTILITY PERMIT

16. Pursuant to Section 337.401(2), Florida Statutes, the permit shall require the permit holder to be responsible for damage resulting from the issuance of the permit. The FDOT may initiate injunctive proceedings as provided in s.120.69 to enforce provisions of this subsection or any rule or order issued or entered into pursuant thereto.
17. Pursuant to Section 337.402, Florida Statutes, when any public road or publicly owned rail corridor is damaged or impaired in any way because of the installation, inspection, or repair of a utility located on such road or publicly owned rail corridor, the owner of the utility shall, at his or her own expense, restore the road or publicly owned rail corridor to its original condition before such damage. If the owner fails to make such restoration, the authority is authorized to do so and charge the cost thereof against the owner under the provisions of s.337.404.
18. The Permittee shall comply with all provisions of Chapter 556, Florida Statutes, Underground Facilities Damage Prevention and Safety Act.
19. Special FDOT instructions: _____

See attached Special Provisions

It is understood and agreed that commencement by the Permittee is acknowledgment and acceptance of the binding nature of all the above listed permit conditions and special instructions.

20. By receipt of this permit, the Permittee acknowledges responsibility to comply with Section 119.07, Florida Statutes.
21. By the below signature, the Permittee hereby represents that no change to the FDOT's standard Utility Permit form, as incorporated by reference into Rule 14-46.001, for this Utility Permit has been made which has not been previously called to the attention of the FDOT (and signified to by checking the appropriate box below) by a separate attached written document showing all changes and the written and dated approval of the FDOT Engineer. Are there attachments reflecting change/s to the standard form? ☒NO ☐ YES If Yes, _____ pages are attached.

PERMITTEE	City of Key West	**SIGNATURE**	City of Key West	**DATE:**	01/31/2017
	Name & Title of Authorized Permittee or Agent (Typed or Printed Legibly)				
APPROVED BY:	Ali Al-Said (sig)			**ISSUE DATE:**	03/29/2017
	District Maintenance Engineer or Designee				

UTILITY PERMIT FINAL INSPECTION CERTIFICATION

DATE:	
DATE WORK STARTED:	
DATE WORK COMPLETED:	
INSPECTED BY:	
(Permittee or Agent)	
CHANGE APPROVED BY: N/A	**DATE:**
District Maintenance Engineer or Designee	

I the undersigned Permittee do hereby CERTIFY that the utility construction approved by the above numbered permit was inspected and installed in accordance with the approved plans made a part of this permit and in accordance with the FDOT's current UAM. All plan changes have been approved by the FDOT's Engineer and are attached to this permit. I also certify that the work area has been left in as good or better condition than when the work was begun.

PERMITTEE: City of Key West	**SIGNATURE:** City of Key West	**DATE:**
Name & Title of Authorized Permittee or Agent (Typed or Printed Legibly)		

CC: District Permit Office
Permittee

APPROVED
2017-H-692-3
Ali Al-Said
3/29/2017

UTILITY PERMIT

PERMIT NO.: 2017-H-692-3

Financial Project ID:

COUNTY:

SECTION NO.:

STATE ROAD:

Preferred Contact	Address	Telephone	E-Mail

The above PERMITTEE requests permission from the State of Florida Department of Transportation, hereinafter called the FDOT, to construct, operate and maintain the following (continued):

Open trench construction (as approved by Nathan Pulido, FDOT South Roosevelt Blvd Project Manager) to install parallel sanitary sewer and water lines (see attached figure C-01) to service future Smathers Beach Bathroom facility. Lane closers limited to 2 lanes at any one time, with traffic diverted/maintained through the other 2 lanes.

Location from/to:

Utilities notified (continuation of provision 1):

KEYS Energy Services (1/11/2017 12:00:00 AM), Florida Keys Aquaduct Authority (1/11/2017 12:00:00 AM)

Ownership of utilities located at (continuation of provision 13):

Supporting documents attached:

WORK WITHIN FDOT RW.pdf, 2017-H-692-3 rev plans 3-28.pdf, 2017-H-692-3 Special Provisions.docx

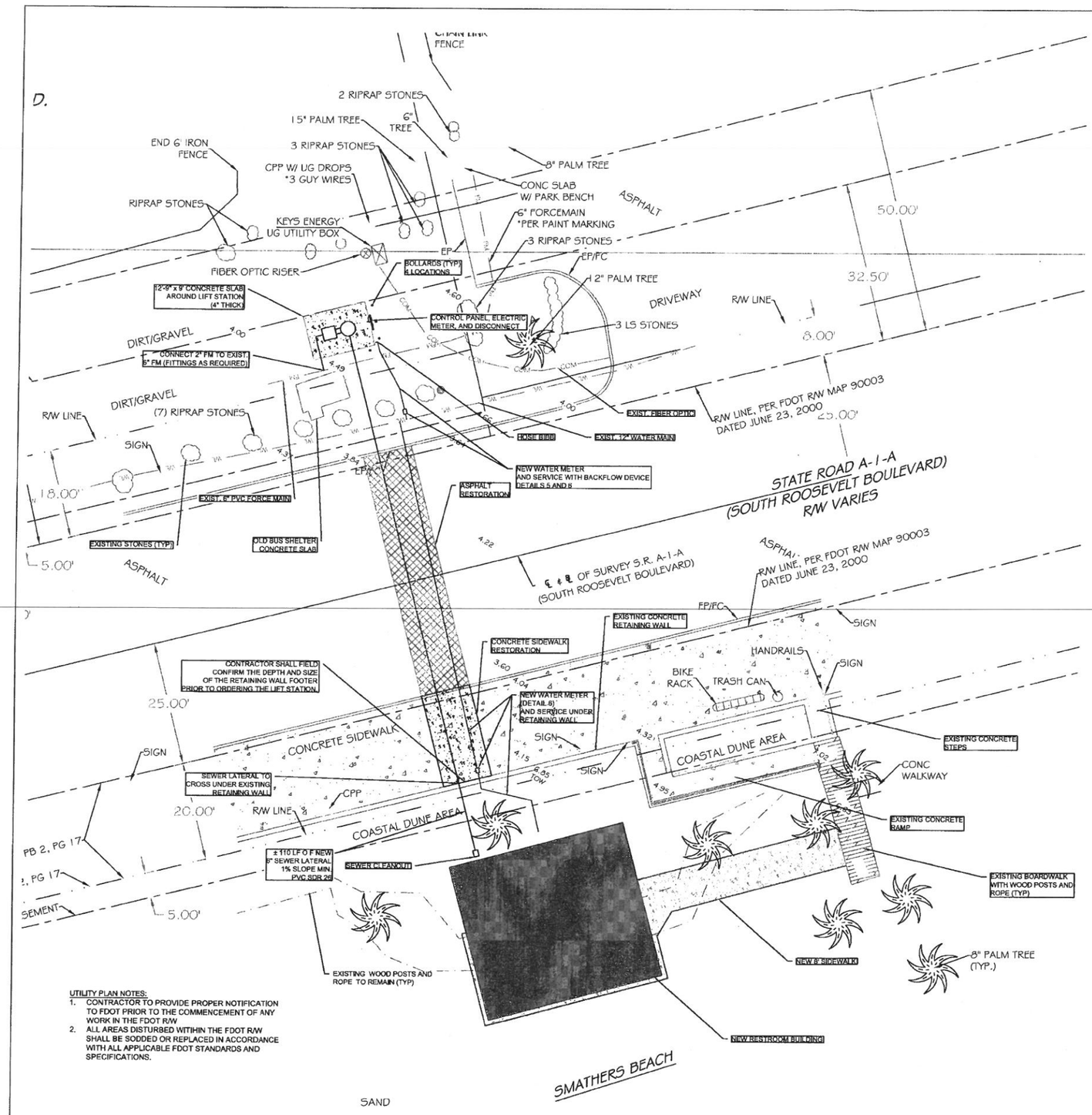
WORK WITHIN THE

F.D.O.T.

RIGHT OF WAY SHALL CONFORM TO CURRENT F.D.O.T. STANDARDS AND SPECIFICATIONS

APPROVED

2017-H-692-3
Ali Al-Said
3/29/2017



UTILITY PLAN NOTES:

1. CONTRACTOR TO PROVIDE PROPER NOTIFICATION TO FDOT PRIOR TO THE COMMENCEMENT OF ANY WORK IN THE FDOT R/W
2. ALL AREAS DISTURBED WITHIN THE FDOT R/W SHALL BE SODDED OR REPLACED IN ACCORDANCE WITH ALL APPLICABLE FDOT STANDARDS AND SPECIFICATIONS.

10' 0 10'
SCALE 1"= 10'
BAR IS TWO INCHES ON ORIGINAL DRAWINGS IF NOT TWO INCHES ON THIS SHEET ADJUST SCALES ACCORDINGLY

GENERAL NOTES

1. THE CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS AND ADVISE THE ENGINEER OF ANY CONFLICTS OF REPRESENTATION BETWEEN DRAWINGS AND/OR SPECIFICATIONS PRIOR TO COMMENCING WITH CONSTRUCTION.
2. THE CONTRACTOR SHALL FIELD-VERIFY EXISTING CONDITIONS PRIOR TO PERFORMING ANY WORK UNDER THIS CONTRACT AND NOTIFY THE ENGINEER IN WRITING OF ANY DIFFERENCES BEFORE COMMENCING WITH ANY CONSTRUCTION.
3. HORIZONTAL COORDINATES ARE BASED ON FLORIDA STATE PLANE COORDINATE SYSTEM. VERTICAL ELEVATIONS ARE BASED ON NGVD 1929 DATUM.
4. THE LOCATIONS, SIZES, AND ELEVATIONS OF EXISTING UTILITIES AS SHOWN ARE APPROXIMATE. THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER TO OBTAIN ANY AVAILABLE RECORD DRAWINGS AND SHALL DETERMINE THE EXACT LOCATION AND ELEVATION IN THE FIELD. THE CONTRACTOR SHALL ANTICIPATE THAT SCANNING AND EXCAVATION USING LIGHT EQUIPMENT AND HAND METHODS WILL BE NECESSARY IN AREAS NEAR EXISTING UTILITIES AND STRUCTURES TO AVOID DAMAGING THESE FACILITIES. THE CONTRACTOR SHALL CONTACT BELLSOUTH, THE LOCAL TELEPHONE COMPANY AND COMCAST, THE LOCAL CABLE TV PROVIDER TO VERIFY THE LOCATION OF BURIED TELEPHONE AND CABLE TV UTILITIES. NONE HAVE BEEN INDICATED ON THE DRAWINGS. CALL 1-800-432-4770 BEFORE DIGGING OR TRENCHING OPERATIONS BEGIN. CONTRACTOR SHALL ALSO CONTACT KEYS ENERGY TO LOCATE SECONDARY ELECTRIC LINES.
5. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION AND ELEVATION IN THE FIELD PRIOR TO INSTALLING ANY NEW WORK THAT CROSSES OR CONNECTS TO EXISTING UTILITY SYSTEMS. LOCATIONS OF NEW UTILITIES SHALL BE ADJUSTED IN A MANNER APPROVED BY THE ENGINEER TO AVOID CONFLICTS. DAMAGES TO UTILITIES RESULTING FROM THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED BY THE CONTRACTOR AT NO COST TO THE CLIENT.
6. ALL EXCAVATION, TRENCHING, SHEETING, SHORING AND BRACING SHALL BE INSTALLED AS REQUIRED IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS, INCLUDING OSHA (29 CFR 1926).
7. ALL ITEMS INDICATED TO BE REMOVED OR DEMOLISHED SHALL BE REVIEWED WITH THE OWNER TO DETERMINE IF THE ITEM IS TO BE PROPERTY OF THE CONTRACTOR. ALL ITMES SHALL BE REMOVED AND DISPOSED OF IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS, UNLESS OTHERWISE NOTED. NO SALVAGE VALUE IS EXPRESSED OR IMPLIED BY THESE CONTRACT DOCUMENTS FOR ANY ITEMS TO BE REMOVED OR DEMOLISHED.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SECURITY OF THE CONTRACTOR'S EQUIPMENT, MATERIALS, AND PERSONNEL, AND SHALL PROVIDE ADEQUATE BARRIERS TO PREVENT RISK TO OTHERS FROM THE CONTRACTOR'S ACTIVITIES.
9. WHERE ACTUAL DIMENSIONS AND SIZES ARE PROVIDED IN THE DRAWINGS, THEY SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONS. LARGE SCALE DRAWINGS SHALL TAKE PRECEDENCE OVER SMALL SCALE DRAWINGS.
10. THE CONTRACTOR SHALL SEQUENCE HIS OPERATIONS SUCH THAT ORANGE MESH SAFETY FENCING IS PROVIDED ALONG ALL AREAS BEING TRENCHED AND NO TRENCH IS LEFT OPEN AT THE END OF THE WORK DAY.
11. NO CONNECTIONS FOR THE PURPOSE OF OBTAINING WATER SUPPLY DURING CONSTRUCTION SHALL BE MADE TO ANY FIRE HYDRANT OR BLOW-OFF STRUCTURE WITH OUT FIRST OBTAINING A CONSTRUCTION METER FROM THE FLORIDA KEYS AQUEDUCT AUTHORITY.
12. IF UNSATISFACTORY MATERIAL FOR ADEQUATE BEARING IS ENCOUNTERED AT THE NORMAL SUBGRADE, THE UNSATISFACTORY MATERIAL SHALL BE REMOVED AND REPLACED WITH SUITABLE FOUNDATION STABILIZATION MATERIAL AS SPECIFIED. REMOVE SOILS AND OTHER MATERIALS THAT ARE NOT SUITABLE MATERIALS FOR TRENCH BOTTOM TO SIX INCHES UNDER PIPE, MINIMUM.

    REMOVE WET, YIELDING, OR MUCKY SOILS. REMOVE THE FOLLOWING SOILS:
    a. TYPE CH AND TYPE MH CLASS IV SOILS.
    b. ALL CLASS V SOILS.

    REMOVE ORGANIC MATERIAL INCLUDING ROOTS, MULCH, OR OTHER VEGETABLE MATTER, WHICH IN THE OPINION OF THE ENGINEER, WILL RESULT IN UNSATISFACTORY FOUNDATION CONDITIONS.

    REMOVE SOILS CONTAINING COBBLES, BOULDERS OR STONES LARGER THAN ONE AND ONE-HALF INCHES (1-1/2") IN DIAMETER.

    REMOVE LEDGE ROCK AND HARDPAN. REMOVE ROCK AND HARDPAN TO PROVIDE BEDDING WIDTH 24 INCHES WIDER THAN PIPE.

    REMOVE SOILS CONTAINING RUBBISH, TRASH, OR OTHER FOREIGN MATERIALS.
13. IN GENERAL, EXISTING STRUCTURES AND UTILITIES ARE NOTED AS EXISTING AND/OR SHOWN IN LIGHT LINE WEIGHT. NEW CONSTRUCTION IS SHOWN IN HEAVY LINE WEIGHT.
14. ALL FIELD LAYOUT AND SURVEYING FOR CONSTRUCTION OF THIS PROJECT SHALL BE PROVIDED BY THE CONTRACTOR AT HIS EXPENSE, UNDER THE DIRECTION OF A FLORIDA LICENSED PROFESSIONAL LAND SURVEYOR.

BERMELLO AJAMIL & PARTNERS INC
Architecture • Engineering • Planning
Interior Design • Landscape Architecture
2601 South Bayshore Drive
Suite 1000
Miami, Florida 33133
(305) 859-2050
Fax (305) 860-3700

PREPARED FOR/OWNER:
CITY OF KEY WEST, FL
P. O. BOX 1409
3140 FLAGLER AVENUE
KEY WEST, FL 33041

PROJECT NAME:
SMATHERS BEACH RESTROOM

PROJECT LOCATION/ADDRESS:
SOUTH ROOSEVELT BLVD.
KEY WEST, FL 33040

SUB-CONSULTANT INFORMATION:
PEREZ ENGINEERING & DEVELOPMENT, INC.
Certificate of Authorization No. 8579
1010 Kennedy Drive
Suite 201
Key West, Florida 33040
(305) 293-9440
Fax (305) 293-9441

ALLEN E. PEREZ LICENSE NO. 61468 STATE OF FLORIDA PROFESSIONAL ENGINEER
ALLEN E. PEREZ, P.E.
FLORIDA 61468
SUBMITTAL DESCRIPTION MILESTONE

Construction Plans

REVISIONS:

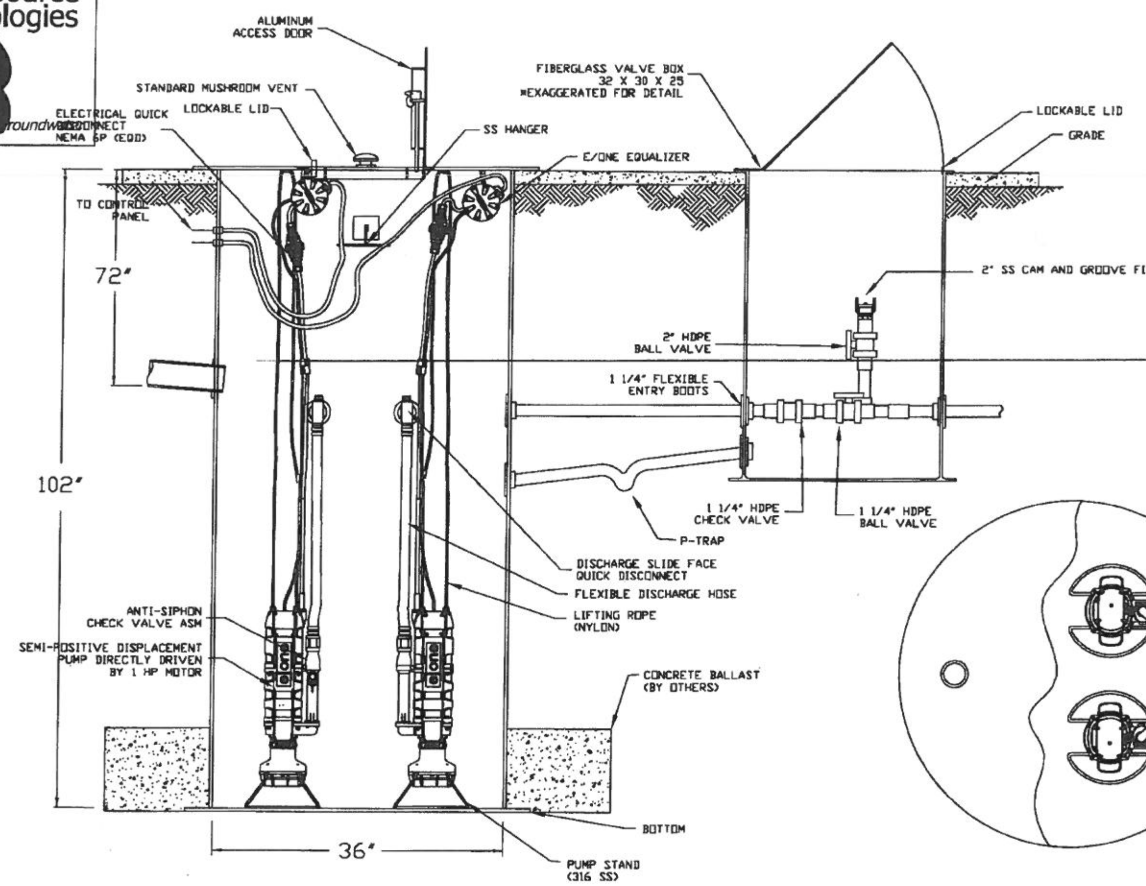
DRAWING SHEET INFORMATION
BA PROJECT NO.: XXXX
SCALE: AS NOTED
DATE: June 10, 2016
DRAWN BY: UT
CHECKED BY: TO

APPROVED
2017-H-692-3
Ali Al-Said
5/29/2017

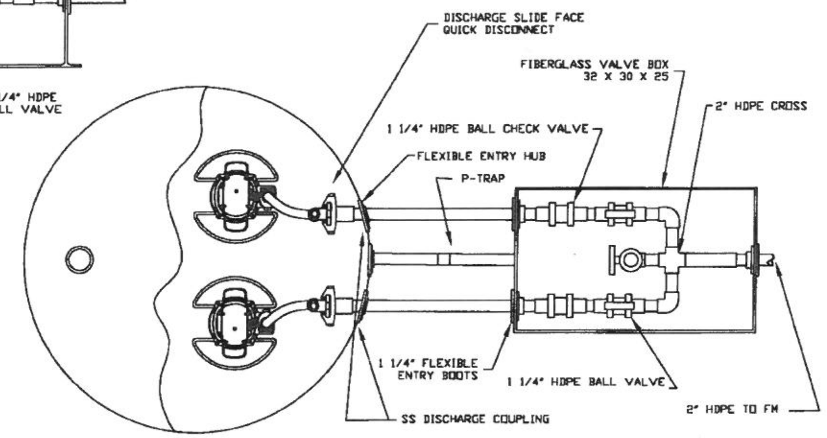
DRAWING TITLE:
SITE /UTILITY PLAN

SHEET NO.
C-01

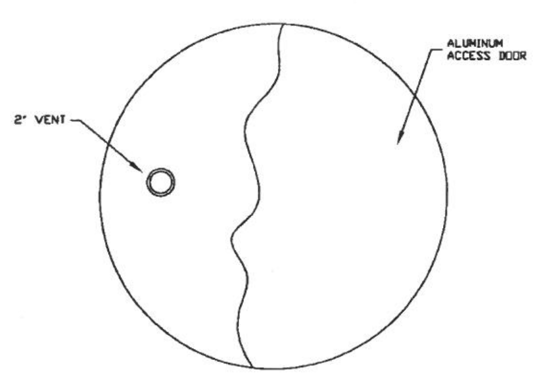
Water ReSource Technologies
Protecting Groundwater



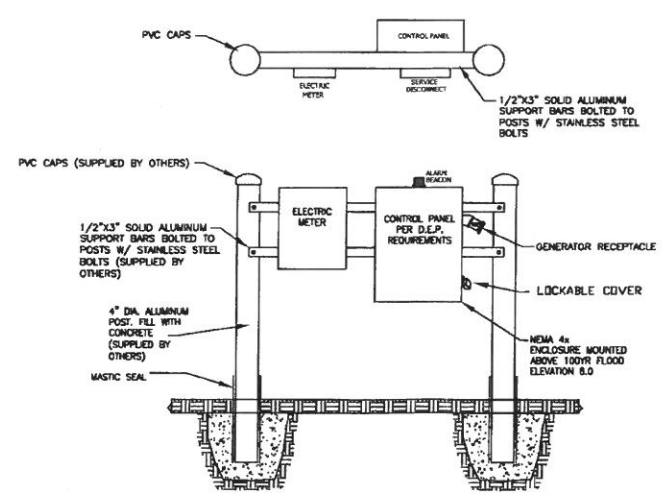
1 Lift Station Section Detail (View Exagerated for Detail)
NTS



2 Lift Station Plan View (View Exagerated for Detail)
NTS



3 Plan View Aluminum Cover
NTS



4 Control Panel Layout
NTS

WRT LIFT STATION SCHEDULE

A	GRADE (TOP)	5.00
B	BOTTOM	(−)3.50
C	INVERT ELEV.	(−)1.00
D	LEAD PUMP ON	(−)1.35
E	LAG PUMP ON	(−)2.00
F	BOTH PUMPS OFF	(−)2.35
H	INLET SIZE	☐ 4" ☒ 6" ☐ 8" ☐ OTHER ____
I	INLET TYPE	☐ SCH-40 ☒ SDR-35
J	VALVE BOX	☒ YES ☐ NO
K	VALVE BOX PIPE	☒ SCH-40 ☐ SCH-80 ☐ HDPE SDR11
L	VENT TYPE	☒ STANDARD MUSHROOM VENT ☐ WRT VENT / CHECK ☐ ~~WRT ODOR VENT~~

WRT LIFT STATION SIZE CHART

DIAMETER (A)	HEIGHT (B)	COVER OVER DISCHARGE (C)
☐ 36"	☐ 84"	☐ 12"
☐ 48"	☒ 102"	☐ 18"
☐ 60"	☐ 108"	☐ 24"
☐ 72"	☐ 114"	☐ 30"
☒ OTHER 36"	☐ 120"	☒ 36"
	☐ 126"	☐ 48"
	☐ 132"	☐ OTHER ____
	☐ 138"	BY ENGINEER OR CONTRACTOR
	☐ 144"	
	☐ OTHER ____	

WRT PANEL / CONTROL OPTIONS

STANDARD COMPONENTS

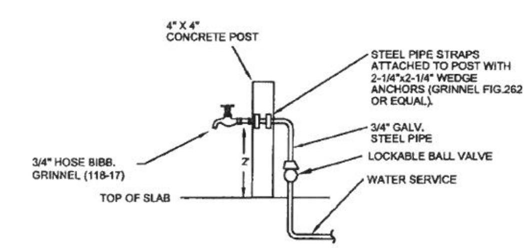
1 NEMA 4X ENCLOSURE ☒ FIBERGLASS (standard) ☐ S.S. ENCLOSURE (upgrade)
2 FLORIDA D.E.P. COMPLIANT ☒
3
4
5

ADDITIONAL OPTIONS

☐ HIGH TIDE SATELLITE SCADA SYSTEM
____ # OF DIGITAL INPUTS
____ # OF ANALOG INPUTS ☐ NEMA 4X ENCLOSURE

WRT PUMP STATION COMPLIANCE NOTES

WRT WET WELL DUPLEX IS SUPPLIED WITH E|ONE U-SERIES 1HP, 240V, SINGLE PHASE GRINDER PUMPS. EACH PUMP INCLUDES CHECK VALVE, ANTI-SIPHON VALVE AND INTEGRAL CONTROLS.



WATER SERVICE DETAIL
NOT TO SCALE

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Interior Design • Landscape Architecture
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P. O. BOX 1409
3140 FLAGLER AVENUE
KEY WEST, FL 33041

PROJECT NAME:
SMATHERS BEACH RESTROOM

PROJECT LOCATION/ADDRESS:
SOUTH ROOSEVELT BLVD.
KEY WEST, FL 33040

SUB-CONSULTANT INFORMATION:
PEREZ ENGINEERING & DEVELOPMENT, INC.
Certificate of Authorization No. 8579
1010 Kennedy Drive
Suite 201
Key West, Florida 33040
(305) 293-9440
Fax (305) 296-0243

PROFESSIONAL SEAL:
ALLEN E. PEREZ LICENSE No. 51468 STATE OF FLORIDA PROFESSIONAL ENGINEER
ALLEN E. PEREZ, P.E.

Construction Plans

REVISIONS:

DRAWING SHEET INFORMATION
BA PROJECT NO.: XXXX
SCALE: AS NOTED
DATE: June 10, 2016
DRAWN BY: UT
CHECKED BY: TO

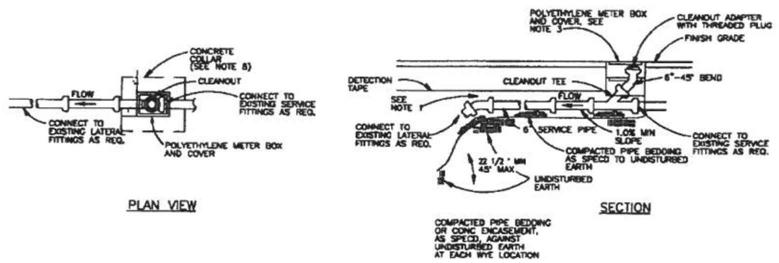
DRAWING TITLE:
LIFT STATION DETAILS

SHEET NO. C-02

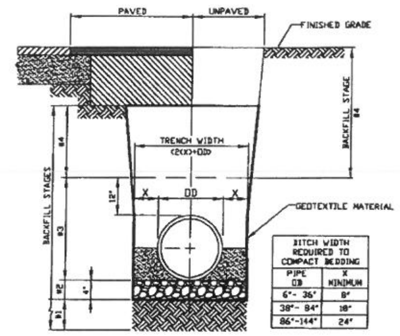
APPROVED
2017-H-692-3
Ali Al-Said
3/29/2017

NOTES:

1. CONTRACTOR SHALL PROVIDE AN ADEQUATE SUPPLY OF 22 1/2°, 45° AND 8" WYES BENDS TO MEET VARYING FIELD CONDITIONS.
2. LENGTH OF SERVICE PIPE VARIES AT EACH SERVICE CONNECTION AND SHALL BE PROVIDED AS REQUIRED TERMINATE SERVICE AT LOCATION DIRECTED BY THE ENGINEER.
3. INSTALL MULTIPLE METER BOXES AS REQUIRED TO BRING TO GRADE.
4. IF SERVICE PIPE MATERIAL IS NOT THE SAME AS SEWER MAIN, CONNECTION SHALL BE APPROVED PRIOR TO CONSTRUCTION.
5. CONNECT AT TRENCH WALL OR AT SERVICE CONNECTION AT SEWER MAIN, AS DIRECTED BY THE ENGINEER.
6. WHERE ADEQUATE SEPARATION BETWEEN WATER MAIN AND SEWER LATERAL CANNOT BE PROVIDED INSTALL 8" SDR 35 SLEEVE AS DIRECTED BY THE ENGINEER.
7. FOR SERVICE CONNECTION REPAIRS: CONTRACTOR SHALL REPLACE A MINIMUM OF 6 LF OF OF 6" PVC AND/OR FITTINGS AS REQUIRED.
8. ALL NEW CLEAN OUTS INSTALLED THAT ARE NOT IN CITY CONCRETE SIDEWALKS SHALL HAVE A 4" THICK CONCRETE COLLAR.



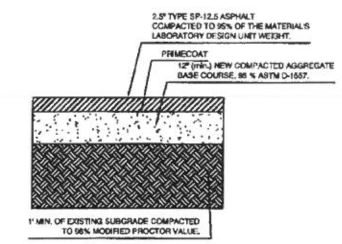
1 Typical Sewer Service Connection
NTS



DITCH WIDTH REQUIRED TO COMPACT BEDDING	
PIPE OD	X MINIMUM
6"- 36"	8"
38"- 84"	18"
86"-144"	24"

SCHEDULE	
STAGE	MATERIAL
#1	BEDDING WHERE DIRECTED GRANULAR MATERIAL (SAND, GRAVEL, OR RECLAIMED CONCRETE), W/WATERSTOP AT 100' INTERVALS.
#2	BEDDING ZONE (LOCAL SAND) MATERIALS A-1, A-2, OR A-3
#3	COVER ZONE (LOCAL SAND) MATERIALS A-1, A-2, OR A-3
#4	TOP ZONE: MATERIALS PER FDOT STANDARD INDEX No. 505 PAVED ROADWAYS-IN 6" LIFTS UNPAVED ROADWAYS-IN 6" LIFTS GRASS SURFACE-IN 12" LIFTS

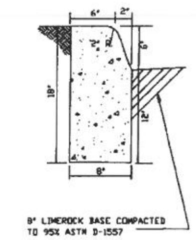
2 Pipe Bedding Detail
NTS



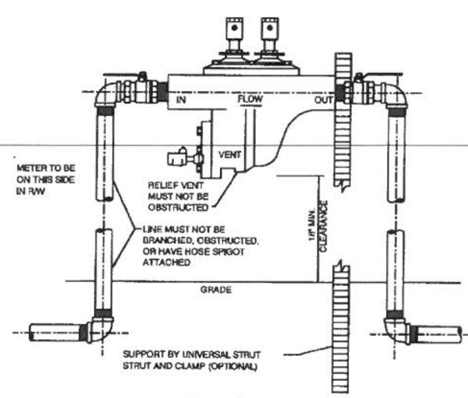
Notes:

All Pavement Materials shall be in accordance with the Florida Department of Transportation Standard Specifications.

3 Asphalt Pavement Road Repair Detail
NTS



4 FDOT Type "D"
NTS

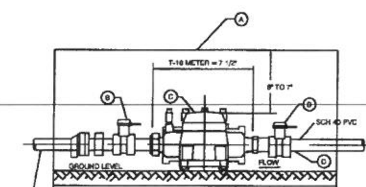


ELEVATION VIEW

NOTES:

1. THE ASSEMBLY MUST BE INSTALLED ON THE CUSTOMER'S PROPERTY, AS CLOSE TO THE METER AS PRACTICAL.
2. THE ASSEMBLY MUST BE ACCESSIBLE FOR TESTING ANNUALLY, AND FOR OVERHAUL EVERY FIVE YEARS.
3. ACCEPTABLE ASSEMBLIES ARE THOSE THAT ARE APPROVED BY EITHER ASSE OR FCCCHR AND MEET THE MINIMUM DESIGN STANDARDS OF THE AWWA.

5 3/4" to 2" Backflow Preventer
NTS



ELEVATION VIEW

A= METER BOX
MID-STATES PLASTICS MODEL #MSBCF1324-12, OR APPROVED EQUAL

B= FORD LOCKABLE METER STOP OR APPROVED EQUAL

METER DIAMETER	METER STOP
3/4"x5/8"	No. B43-342 W *
1"	No. B43-344 W *

* "W" ON CATALOG NUMBER IS FOR PADLOCK WINGS.

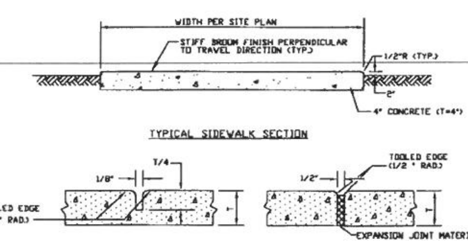
C= SCHLUMBERGER METER/DOUBLE CHECK T-10 ASSEMBLY

D= CUSTOMER TIE-IN POINT

NOTE:

MINIMUM DISTANCES BETWEEN METER INLETS/OUTLETS AND THE CLOSEST FITTINGS SHALL BE MAINTAINED PER METER MANUFACTURER'S REQUIREMENTS.

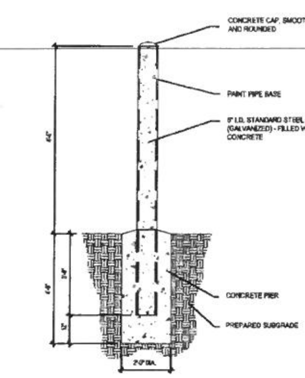
6 5/8" T-10 Meter w/ Double Check Valve Assembly
NTS



NOTES:

1. PROVIDE EXPANSION JOINTS WHERE NEW SIDEWALKS ABUT STRUCTURES AND CONTRACTION JOINTS AT INTERVALS EQUAL TO SIDEWALK WIDTH.
2. REPLACE CONCRETE SIDEWALKS AT SCORED JOINTS TO AVOID A PATCHED APPEARANCE. PROVIDE 2-INCH LEVELING COURSE BENEATH NEW SIDEWALK.

7 Typical Sidewalk and Concrete Pad Detail
NTS



8 Concrete Bollard Detail
NTS

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Interior Design • Landscape Architecture
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PREPARED FOR/OWNER:
CITY OF KEY WEST, FL
P. O. BOX 1409
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KEY WEST, FL 33041

SEAL OF THE CITY OF KEY WEST, FLORIDA

PROJECT NAME:
SMATHERS BEACH RESTROOM

PROJECT LOCATION/ADDRESS:
SOUTH ROOSEVELT BLVD.
KEY WEST, FL 33040

SUB-CONSULTANT INFORMATION:
PEREZ ENGINEERING & DEVELOPMENT, INC.

Certificate of Authorization No. 8579

1010 Kennedy Drive

PROFESSIONAL LICENSE:

PROFESSIONAL ENGINEER STATE OF FLORIDA

SUBMISSION DESCRIPTION / MILESTONE:
Construction Plans

REVISIONS:

DRAWING SHEET INFORMATION

BA PROJECT NO.: XXXX
SCALE: AS NOTED
DATE: June 10, 2016
DRAWN BY: UT
CHECKED BY: TO

DRAWING TITLE:
DETAILS

SHEET NO.
C-03

APPROVED
2017-H-692-3
Ali Al-Said
3/29/2017

FLORIDA DEPARTMENT OF TRANSPORTATION GENERAL NOTES:

1. CONTACT THE LOCAL MAINTENANCE OFFICE (305) 289-4360 TO COORDINATE PRE-CONSTRUCTION MEETING FOURTEEN (14) WORKING DAYS AND TO PROVIDE FORTY-EIGHT (48) HOURS NOTIFICATION PRIOR TO BEGINNING PERMITTED WORK.

2. SUBMIT LANE CLOSURE REQUESTS AT THE LANE CLOSURE INFORMATION SYSTEM WEBSITE (http://gis.atectrans.net/lcis/) FOURTEEN (14) WORKING DAYS PRIOR TO BEGINNING WORK WITHIN THE FDOT RIGHT-OF WAY.

3. WORKING HOURS WITHIN THE STATE RIGHT-OF-WAY SHALL BE FROM 9:00 AM TO 4:00 PM, OR AS DIRECTED BY THE DEPARTMENT REPRESENTATIVE PRIOR TO COMMENCING WORK. THERE SHALL BE NO LANE CLOSURES ON WEEKENDS, HOLIDAYS AND SPECIAL EVENTS WITHOUT PRIOR WRITTEN APPROVAL..

4. VALIDITY OF THIS PERMIT IS CONTINGENT UPON OBTAINING REQUIRED PERMITS FROM ALL OTHER AGENCIES INVOLVED.

5. ALL WORK MUST BE IN ACCORDANCE WITH THE LATEST *FDOT UTILITY ACCOMMODATION MANUAL, FDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION AND FDOT DESIGN STANDARDS.*

6. PERMITTEE IS CAUTIONED THAT UTILITIES MAY BE LOCATED WITHIN THE CONSTRUCTION AREA. CALL 811 TWO (2) DAYS PRIOR TO BEGINNING WORK.

7. SAFE TEMPORARY ACCESS TO ALL ADJACENT PROPERTIES MUST BE PROVIDED AND MAINTAINED AT ALL TIMES. ACCOMMODATIONS FOR INTERSECTING TRAFFIC WITHIN THE CONSTRUCTION ZONE MUST BE PROVIDED AND MAINTAINED AT ALL TIMES. NO ROAD OR STREET CROSSING SHALL BE BLOCKED OR UNDULY RESTRICTED AS DETERMINED BY THE FDOT DEPARTMENT REPRESENTATIVE. ALL ACCESSES SHALL REMAIN OPEN AT ALL TIMES.

8. NO UNSAFE AREA(S) FOR PEDESTRIANS WILL REMAIN DURING ANY TIME OF THE CONSTRUCTION. PEDESTRIAN CONTROL FOR CLOSURE OF ROADS AND SIDEWALKS SHALL BE IN ACCORDANCE WITH LATEST *FDOT DESIGN STANDARDS AND FDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.*

9. A COPY OF THE APPROVED PERMIT, APPROVED PLANS AND APPROVED LANE CLOSURE(S) MUST BE KEPT ON THE JOB SITE AT ALL TIMES DURING THE PERMITTED WORK.

10. IN THE EVENT THAT THE ROADWAY PAVEMENT IS DAMAGED, IT SHALL BE RESTORED IN FULL LANE TO MATCH OR EXCEED EXISTING CONDITIONS AND IN ACCORDANCE WITH THE *LATEST FDOT DESIGN STANDARDS AND STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.*

11. OPEN CUTTING OF EXISTING PAVED DRIVEWAY CONNECTIONS AND SIDE STREETS SHALL BE RESTORED IN FULL LANE FROM EDGE OF PAVEMENT TO FDOT RIGHT-OF-WAY LINE.

12. THE USE OF STEEL PLATES WILL BE AT THE DISCRETION AND APPROVAL OF THE DEPARTMENT REPRESENTATIVE. PLATES MUST BE SECURED WITH SPIKES AND COMPACTED ASPHALT.

13. TYPE D4 FILTER FABRIC IS REQUIRED BY THE DEPARTMENT TO BE PLACED WHERE ANY MATERIAL THAT CAN, DURING THE PROJECT LIFE BE SUBJECTED TO HIGH WATER TABLE, WHETHER IT IS PLACED IN THE DRY OR IN THE WET AND REQUIRES A FULL ENCAPSULATION OF THE GRANULAR MATERIAL.

14. WHEN PERMITTED WORK IS WITHIN FIVE (5) FT OF THE EXISTING TREES' DRIP LINES, TREE PROTECTION MEETING THE *FDOT 2013 DESIGN STANDARD INDEX 542* MUST BE INSTALLED.

15. ROOT OR CANOPY TRIMMING REQUIRED TO REDUCE THE IMPACTS TO THE EXISTING VEGETATION MUST BE OVERSEEN BY A CERTIFIED ARBORIST.

16. FDOT APPROVED EROSION DEVICES MUST BE PLACED BEFORE PERMITTED WORK BEGINS AND MAINTAINED THROUGHOUT THE PROJECT.

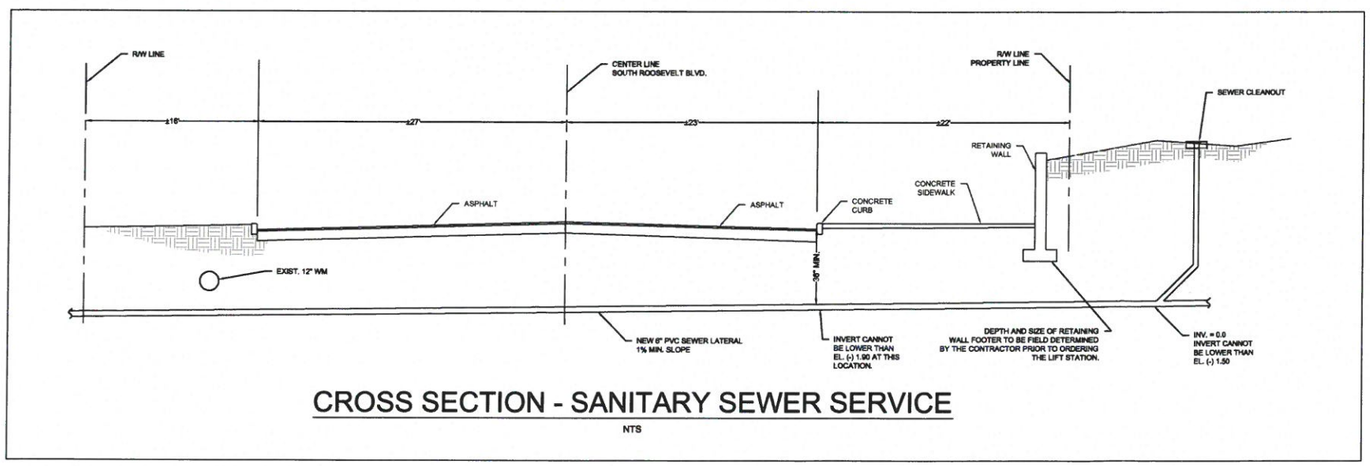
17. ALL FINAL RESTORATION SHALL BE COORDINATED WITH THE DEPARTMENT REPRESENTATIVE. ALL PORTIONS OF THE STATE RIGHT-OF-WAY SHALL BE RESTORED WITHIN THIRTY (30) DAYS OF COMPLETION OF THE PERMITTED WORK.

18. WHEN FDOT ROADWAY IMPROVEMENTS HAVE COMMENCED OR BEEN COMPLETED PRIOR TO COMPLETION OF WORK PERMITTED UNDER THIS PERMIT, THIS PERMIT SHALL BECOME VOID.

ENVIRONMENTAL NOTES:

1. ENSURE APPROPRIATE EROSION CONTROL DEVICES ARE IN PLACE BEFORE WORK BEGINS AND ARE USED THROUGHOUT THE PROJECT.

2. NO CONTAMINATION ISSUES ARE EXPECTED GIVEN THE SCOPE OF THE PROJECT; HOWEVER, THE FOLLOWING PROTOCOL SHOULD BE IMPLEMENTED:
-IN THE EVENT THAT SOIL OR GROUNDWATER CONTAMINATION IS IDENTIFIED DURING EXCAVATION, THE APPLICANT IS TO CONTACT THE ASSISTANT CONTAMINATION IMPACT COORDINATOR AT (305) 470-5138 AND PROVIDE THE DEPARTMENT COPIES OF CONTAMINATION-RELATED DELIVERABLES SUBMITTED TO ENVIRONMENTAL REGULATORY AGENCIES. THE REPORTS ARE TO BE SUBMITTED TO THE DISTRICT CONTAMINATION IMPACT COORDINATOR AT 1000 N.W. 111TH AVENUE, MIAMI, FL 33172-5800 (ROOM #6109).



CROSS SECTION - SANITARY SEWER SERVICE

NTS

KEY MAP

NTS

BERMELLO AJAMIL & PARTNERS INC

Architecture • Engineering • Planning
Interior Design • Landscape Architecture
2601 South Bayshore Drive
Suite 1000
Miami, Florida 33133
(305) 859-2050
Fax (305) 860-3700

PREPARED FOR/OWNER:
CITY OF KEY WEST, FL
P. O. BOX 1409
3140 FLAGLER AVENUE
KEY WEST, FL 33041

PROJECT NAME:
SMATHERS BEACH RESTROOM

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SUB-CONSULTANT INFORMATION:
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Certificate of Authorization No. 8579

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(305) 293-9440
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PROFESSIONAL SEAL:

ALLEN E. PEREZ, P.E.
FLORIDA 51468

SUBMITTAL DESCRIPTION / MILESTONE:

BID SET
February 2, 2017

REVISIONS:

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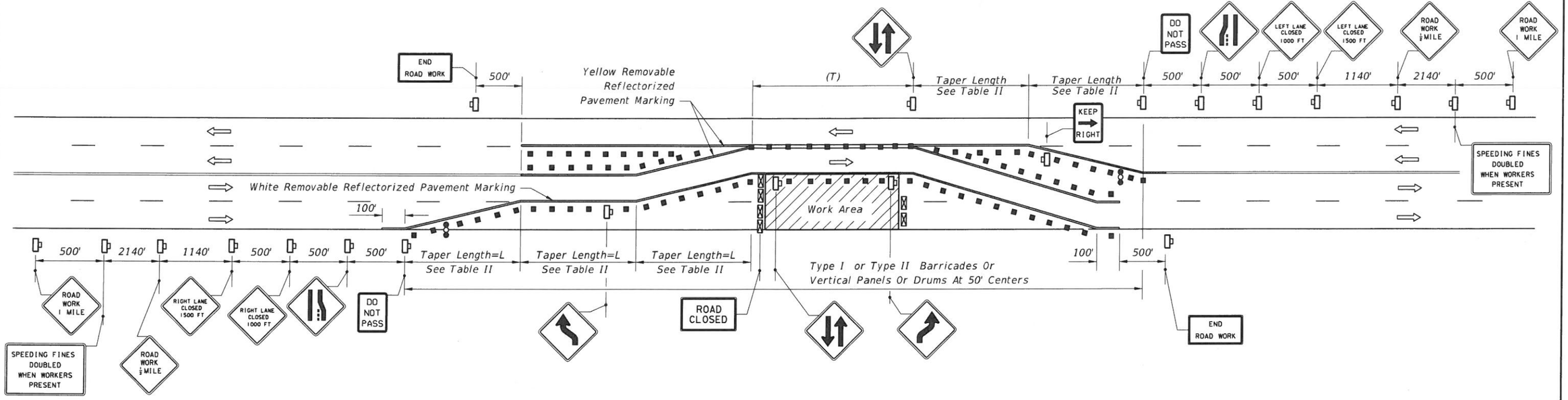
DRAWING SHEET INFORMATION

BA PROJECT NO.:	XXXX
SCALE:	AS NOTED
DATE:	June 10, 2016
DRAWN BY:	UT
CHECKED BY:	TO

APPROVED
[illegible]-692-3
[illegible] Al-Said
3[illegible]417

DRAWING TITLE:
FDOT GENERAL NOTES AND SECTION

SHEET NO.:
C-04



SYMBOLS

- Work Area
- Channelizing Device (See Index No. 600)
- Type III Barricade
- Work Zone Sign
- Advance Warning Arrow Board
- Lane Identification + Direction of Traffic

GENERAL NOTES

1. TWO-WAY TRAFFIC signs shall be repeated every ¼ mile in each direction, through the tangent distance (T).
2. When paved shoulders having a width of 8 ft. or more are closed, channelizing devices shall be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the travel way. See Index No. 612 for shoulder taper formulas.
3. Where the tangent distance (T) exceeds 250', spacing between cones or tubular markers may be increased to 50' or spacing between Type I or Type II barricades or vertical panels or drums may be increased to 100' within the limits of the tangent.
4. This index does not apply when work is being performed in the middle lane(s) of a six or more lane highway. Special maintenance of traffic details will be required.
5. When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
6. For general TCZ requirements and additional information, refer to Index No. 600.

Table II
Taper Length - Merge
(12' Lateral Transition)

Speed (mph)	L (ft.)	Notes (Merge)
25	125	$L=\frac{WS^2}{60}$
30	180	
35	245	
40	320	
45	540	L=WS
50	600	
55	660	
60	720	
65	780	
70	840	

For lateral transitions other than 12' use formula for L shown in the notes column.
Where:
L = Length of taper in feet
W = Width of lateral transition in feet
S = Posted speed limit (mph)

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES REQUIRE THE CLOSURE OF THE LANES IN ONE DIRECTION AND A DIVERSION IS PROVIDED BY UTILIZING ONE LANE OF THE OPPOSING TRAFFIC LANES.

10/12/2016 1:14:31 PM

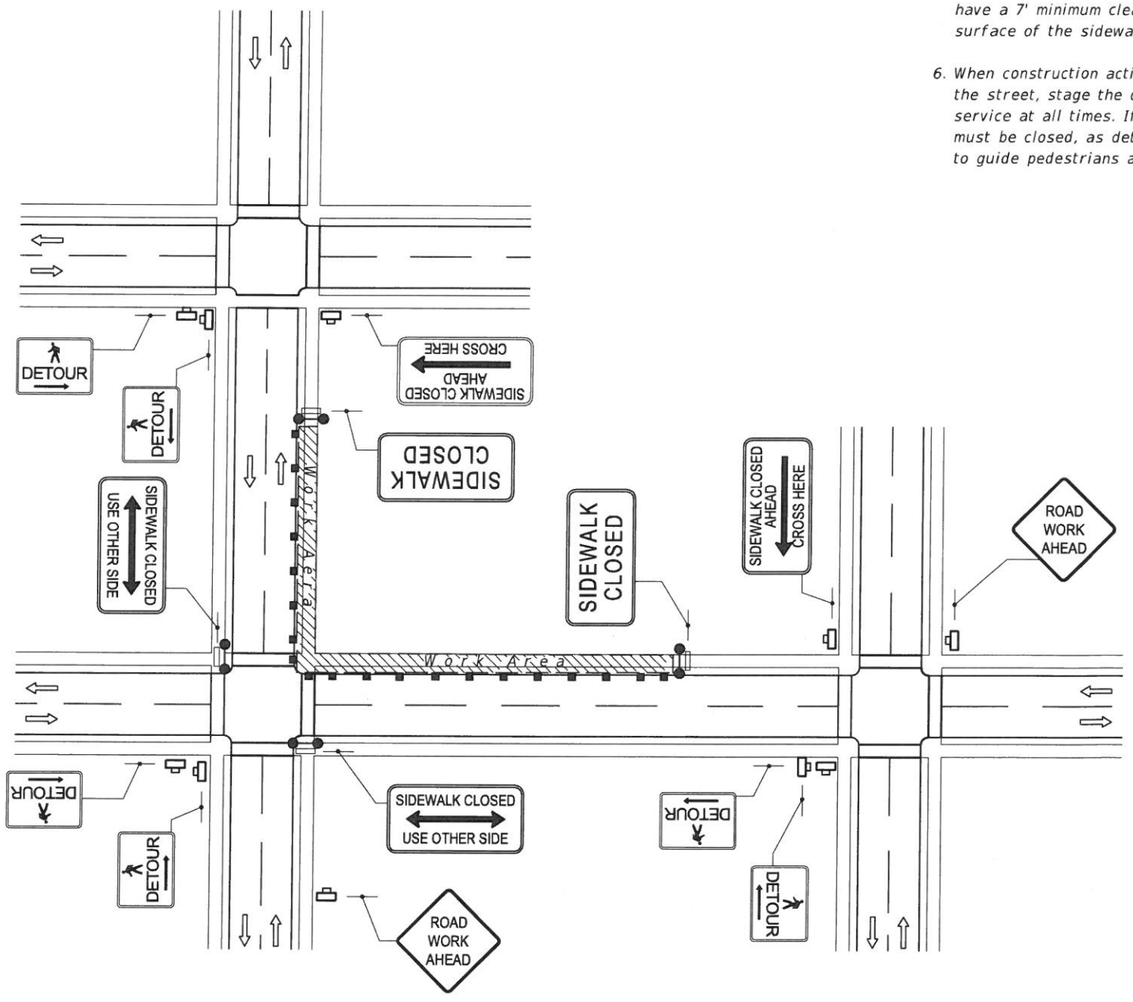
LAST REVISION	REVISION	DESCRIPTION:	FDOT FY 2017-18 DESIGN STANDARDS	MULTILANE, UNDIVIDED TEMPORARY DIVERSION CONNECTION	INDEX NO.	SHEET NO.
07/01/15					621	1 of 1

SYMBOLS

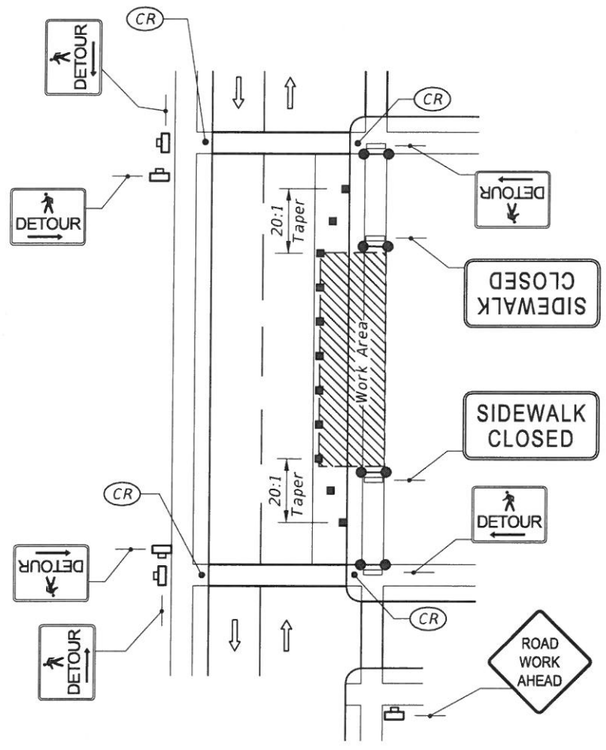
- Work Area
- Channelizing Device (See Index 600)
- Work Zone Sign
- CR — Required Locations For Either Temporary Or Permanent Curb Ramps.
- Lane Identification + Direction of Traffic
- Pedestrian Longitudinal Channelizing Device (LCD) with Mounted Work Zone Sign or separate Work Zone Sign
- Pedestrian Longitudinal Channelizing Device (LCD)

GENERAL NOTES

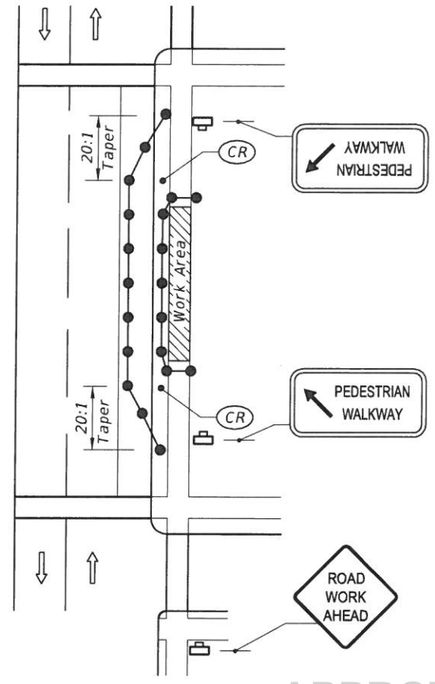
1. Route pedestrian traffic around work areas when construction activities encroach on the sidewalk for more than 60 minutes using the devices and remedies shown on this Index. Use project specific designs for scenarios not included on this Index.
2. For spacing of traffic control devices and general TCZ requirements refer to Index 600. The maximum spacing between barricades, vertical panels, drums or tubular markers is 25'.
3. Use delineators on longitudinal channelizing devices separating the work area from vehicular traffic.
4. Cover or deactivate pedestrian traffic signal display(s) controlling closed crosswalks.
5. Post mounted signs located near or adjacent to a sidewalk must have a 7' minimum clearance from the bottom of sign to the surface of the sidewalk.
6. When construction activities involve sidewalks on both sides of the street, stage the construction so that one sidewalk is in service at all times. If this is not feasible and both sidewalks must be closed, as determined by the Engineer, provide a detour to guide pedestrians around the construction zone.
7. Provide a 5' wide temporary walkway, except where space restrictions warrant a minimum width of 4'. Provide a 5' x 5' passing space for temporary walkways less than 5' in width at intervals not to exceed 200'.
8. Provide a cross-slope with a maximum value of 0.02 for all temporary walkways.
9. Temporary walkway surfaces and ramps must be stable, firm, slip resistant, and kept free of any obstructions and hazards such as holes, debris, mud, construction equipment and stored materials.
10. Remove temporary walkways immediately after reopening of the sidewalk, unless otherwise noted in the plans.
11. Meet the requirements of Index 304 for temporary curb ramps.
12. Place pedestrian longitudinal channelizing device(s) across the full width of the closed sidewalk. For temporary walkways, similar to the Sidewalk Diversion, place LCD's to delineate both sides of the temporary walkway.



CROSSWALK CLOSURE AND PESESTRIAN DETOUR



SIDEWALK DETOUR



SIDEWALK DIVERSION

10/12/2016 1:18:55 PM

LAST REVISION	REVISION	DESCRIPTION:	FDOT	FY 2017-18 DESIGN STANDARDS	PEDESTRIAN CONTROL FOR CLOSURE OF SIDEWALKS	INDEX NO.	SHEET NO.
11/01/16						660	1 of 1

Special Provisions for Utility Permit # 2017-H-692-3
CITY OF KEY WEST SMATHERS BEACH SEWER & WATER / US Hwy 1
Section: 90003000/MP 0.32/MM 0

1. Coordination of a pre-construction meeting (referencing this permit number) is required at a minimum of fourteen (14) working days prior to beginning work within the Florida Department of Transportation (FDOT) Right-of-Way. Please contact Juan Chinea by telephone at (305) 619-1635 or by e-mail at drichardson@ica-onramp.com. Notification must be provided to the above-mentioned representative at least forty-eight (48) hours prior to commencement of work.

2. All Lane Closure Requests should be submitted by the Permittee at the Lane Closure Information System website (http://fdotlcis.com/) at a minimum of fourteen (14) working days prior to beginning work within the FDOT right-of-way.

   Lane Closure Requests will not be reviewed until a copy of the pre-construction meeting agenda and minutes have been provided to Nancy Miller at nmiller@ica-onramp.com or at the ICA Office at 3100 Overseas Highway in Marathon, FL (33050). Working hours within the State Right-of-Way shall be from 9:00 AM to 4:00 PM or as directed by the Department Representative prior to commencement of work. There shall be no lane closure on weekends, Holidays, and Special Events without prior written approval.

   The Department reserves the right to access any portion of the State Right-of-Way. Department Representative(s) reserve the right to increase or decrease the approved time frames.

3. **A copy of the Approved Permit, Approved Plans and Approved Lane Closure(s) will be kept on the job site at all times during the permitted work.**

4. **All permitted work must be with accordance to the FDOT Utility Accommodation Manual (Current Edition) and the FDOT Standard Specifications for Road and Bridge Construction (Current Edition).**

5. The Permittee shall ensure that appropriate erosion control devices are in place before work begins and are used throughout the project.
   The Permittee shall assure that any actions carried out are in accordance with all environmental regulatory requirements.
   If dewatering is performed, direct effluent discharge to an outstanding Florida Water is prohibited. The FDOT drainage system outfall to the intercostal waterways, therefore the Permitee cannot use the FDOT drainage system to discharge the dewatering effluent. The overflow effluent, if any, needs to be controled on-site.

6. **Please be advised that the Department currently has a project under design in the area of this permit (FM:250548-8). Please coordinate with the Department Project Manager, Nathaniel Pulido at (305) 470-5207 as needed.**

7. This permit does not grant approval for the installation, modification, or other construction of any driveway connection(s) within the F.D.O.T right-of-way. A separate driveway connection permit application by the utility owner must be submitted to and approved by the department prior to beginning any work in conjunction with any proposed driveway connection(s).

8. The Permittee shall provide and maintain safe temporary access to all adjacent properties at all times and shall maintain accommodations for intersecting and crossing traffic within the construction's zone. No road or street crossing shall be blocked or unduly restricted as determined by the FDOT Department Representative. All accesses shall remain open at all times.

9. The use and approval of steel plates will be at the discretion of the Department Representative's. All plates must be secured in place with pins and compacted asphalt.

10. The Permittee will ensure that no unsafe area(s) for pedestrians will remain during any time of the construction. Pedestrian control for closure of roads and sidewalks shall be in accordance with the *FDOT Design Standards (Current Edition), Index Series 600*.

11. Validity of this permit is contingent upon Permittee obtaining required permits from all other agencies involved.

12. Permittee is cautioned that utilities may be located within the construction area.

13. All overhead crossing shall maintain clearance of eighteen (18) feet minimum clearance according to the current utility accommodation manual.

14. Clearances for aboveground lines that are parallel to the right-of-way will be 16' minimum except where side roads connect which shall be 18' minimum.

15. Where it is necessary to place temporary supports for aerial crossings which will interfere with traffic, careful planning of work with regard to the safety of vehicular traffic is mandatory (UAM 5.5.2).

16. Any excavation that occurs under the drip line of any tree must first have the roots pruned at the direction of a Certified Arborist.

17. No staging of equipment shall occur within the dripline/root zones of existing trees.

18. Root pruning or canopy trimming required to reduce impacts to existing vegetation must be overseen by a Certified Arborist.

19. Install tree protection, per FDOT Design Standard Index 544, at the drip line of trees when work comes within 5' of tree drip lines.

20. All final restoration shall be coordinated with the Department Representative. All portions of the State right-of-way shall be restored within thirty (30) days upon completion of the permitted installation.

21. If FDOT roadway improvements have commenced or been completed prior to the installation of the work approved under this permit, this permit shall become void at the discretion of the Department Representative.

22. Beginning any work within the FDOT Right-of-Way associated with this permit constitutes acceptance of these conditions.

23. Ensure not to disturb landscape in medians.

24. The Permittee shall ensure that appropriate erosion control devices are in place before work begins and are used throughout the project.

25. The Permittee shall ensure that any actions carried out are in accordance with all environmental regulatory requirements.

26. **WITHIN 2 WEEKS of completion of project: All required documents such as pre-construction meeting agenda and minutes, density tests, design mix, and as-builts along with an approved final inspection will be required to close this permit.**

PART 8

REPORTS, ANALYSIS, CODE

Nutting Engineers
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May 25, 2017

Mr. Scott Bakos
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Miami, Florida 33133
Phone: (305) 859-2050 Email: sbakos@mermelloajamil.com

Subject: Addendum No. 1 to Report of Geotechnical Exploration
Smather's Beach Restroom and Pump Station
S. Roosevelt Blvd.
Key West, Florida

Dear Mr. Bakos:

Nutting Engineers of Florida, Inc. (NE), has provided a Report of Geotechnical Exploration for the project dated May 13, 2016 for the above referenced site in Key West, Florida. Since the report has been provided, we understand owing to the project being located within an erosion zone a deep foundation option for the proposed restroom has been requested. Based on this new information our office has been requested to provide supplemental analysis and recommendations for support of the proposed structures. Specifically, lateral capacity for various diameter augercast piles.

REVISED ANALYSIS AND RECOMMENDATIONS

Augercast Piles: This type of pile can support large structural loads, have a relatively quick installation time, and are in our opinion the most economical and technically feasible deep foundation system. Based on our review of the boring logs and our experience with similar projects, we estimate that maximum lateral pile capacities will be on the order 15 tons or less. Therefore, the following analysis is based on a maximum lateral capacity of 15 tons

The results of our analysis indicate that lateral pile capacities on the order of 10 tons may be supported on 16-inch diameter or 15 tons supported on 24-inch diameter augercast piles installed to tip depths of approximately fifteen feet below the existing ground surface. The actual depths should be expected to vary depending on the drilling conditions encountered during installation

of these piles. The depths of the pile tips as recommended in this report are based on the ground surface elevations as they existed at the time the test borings were performed.

The piling contractor shall submit the proposed pile design to Nutting Engineers of Florida, Inc. for their review and comment prior to proceeding with pile installation.

AUGERCAST PILE CAPACITY TABLE

Pile Diameter (Inches)	Depth Below Exist. Ground (Ft)	All. Compr. Capacity (Tons)	All. Lateral Capacity (Tons)	Minimum Grout Strength (psi) ($0.3\ f'_c$)
16	15	25	10	4,000
24	15	40	15	4,000

Pile Observations

It is important that the installation of all piles be under the full time observation of a representative of Nutting Engineers to verify the piles will meet the engineering intent.

Pile Reinforcement

We recommend that at a minimum, one full length #6 reinforcing steel bar utilizing centralizers be installed within the piles. Additional reinforcing may be required depending on the structural engineer's requirements.

We recommend that a structural engineer be retained to determine the spacing and locations of the pile foundation system. Discussions should be initiated between the owners, structural engineer, contractor, and Nutting Engineers to provide detailed specifications for the foundation installation work.

GENERAL INFORMATION

Our client for this geotechnical evaluation was:

Mr. Scott Bakos
Bermello, Ajamil & Partners, Inc.
2601 S. Bayshore Drive, Suite 1000
Miami, Florida 33133

The contents of this report are for the exclusive use of the client and the client's design team for this specific project exclusively. Information conveyed in this report shall not be used or relied upon by other parties or for other projects without the expressed written consent of Nutting Engineers of Florida, Inc. This report discusses geotechnical considerations for this site based upon observed conditions and our understanding of proposed construction for foundation support. Environmental issues including (but not limited to), soil and/or groundwater contamination are beyond our scope of service for this project. As such, this report should not be used or relied upon for evaluation of environmental issues.

We appreciate the opportunity to provide these services for you. If we can be of any further assistance, or if you need additional information, please feel free to contact us.

Sincerely,
NUTTING ENGINEERS OF FLORIDA, INC.

Natalie Chacin for.
Richard C. Wohlfarth, P.E.
Director of Engineering

5/25/2017
Stephen J. Mrachek, P.E. #70784
Senior Engineer

LTR ADD1 BERMELLO AJAMIL & PARTNERS SMATHErS BEACH RESTROOM PILES SJM

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May 3, 2017

Mr. Scott Bakos
Bermello, Ajamil & Partners, Inc.
900 SE 3rd Avenue, Suite 203
Fort Lauderdale, FL 33316

Re: Coastal Engineering Analysis for the Smathers Beach Bathroom Facility at 2001 South Roosevelt Boulevard, Key West, FL 33040

Dear Mr. Bakos:

This letter summarizes the results of the coastal engineering analysis of the 100-year return period storm event for the proposed bathroom facility at Smathers Beach located at 2001 South Roosevelt Boulevard, City of Key West, Monroe County, Florida (Project). The proposed design is required to satisfy the requirements of the City of Key West Flood-Resistant Development Ordinance (Ordinance) for development in a VE flood zone. The design criteria presented below can be utilized by the structural engineer to account for erosion and wave loads in the design of the walls and foundation of the proposed structure.

Erosion Analysis

Waves and currents associated with flood conditions are capable of creating erosion and scour. Erosion is the general lowering of the ground surface over a wide area caused by the movement of wind and water. Scour is the localized loss of soil, often around a foundation element, caused by the turbulence created by waves and currents. An understanding of potential erosion and scour is critical in designing coastal foundations to ensure that failure during and after flooding does not occur as a result of the loss of either bearing capacity or anchoring resistance around posts, piles, columns, footings, or walls. Determining site-wide erosion and localized scour requires knowledge of the storm surge elevation, flow conditions, soil characteristics, and foundation type.

The lowest eroded ground elevation is the lowest ground surface elevation that will result from both erosion and scour during a 100-year design flood. Localized scour calculation methods in coastal areas are primarily based on empirical evidence gathered after storms and experiments. The site-wide erosion analysis was completed using methods described in the Federal Emergency Management Agency (FEMA) *Guidelines and Specifications for Flood Hazard Mapping Partners (*FEMA 2007). The local scour analysis was completed using methods described in the FEMA *Coastal Construction Manual* (FEMA 2011).

The existing Project site is unoccupied, located in the upper coastal dune area, and is partially vegetated. The average grade on the existing Project site is between +5 and +7 feet NGVD. A single-story public bathroom facility is proposed on the site. The FEMA-defined 100-year storm surge elevation storm published in the Flood Insurance Study (FIS) for Monroe County (FEMA

2005) was adopted for the analysis. Transect 4 in the FIS, which extends from the Atlantic Ocean coastline at Smathers Beach and extends upland across U.S. Route 1, was determined to be most representative of the Project site. The published 100-year storm surge elevation for Transect 4 is +8.5 feet NGVD.

A representative beach profile was developed using data from the Topographic Survey for the Project site prepared by Florida Keys Land Surveying dated February 17, 2016 for the upland area and publically available bathymetric data for the offshore areas (NOAA 2016).

The eroded profile resulting from the FEMA-defined 100-year return period storm event was calculated and is illustrated in Figure 1. Site-wide erosion extending under the proposed structure is expected during the 100-year return period storm event. The seaward edge of the proposed structure extends approximately 73.0 feet landward of the approximate Mean High Water (MHW) line shown on the Topographic Survey and the Site Plan prepared by Bermello, Ajamil & Partners, Inc. dated March 21, 2017.

Section §34-133(3)(c) of the Ordinance does not require the proposed structure to meet the elevation requirements of ASCE 24-05. However, Section 34-133(3)(d) does require the proposed structure to meet foundation requirements of ASCE 24-05, which states that "spread footing, mat, or raft foundations shall not be used unless the top of the spread footing, mat, or raft foundation is below the eroded ground elevation. Where surface or subsurface conditions consist of nonerodible soil that prevents the use of pile or deeply embedded column foundations, spread footing or mat foundations shall be permitted provided they are anchored, if necessary to prevent sliding, uplift, or overturning, to nonerodible soil with sufficient strength to withstand forces from the combination of loads in ASCE 7."

The lowest eroded ground elevation adjacent to vertical walls considers the storm surge elevation and horizontal length of exposed wall. The Pre-Fab Bathroom Floor Plan shows the proposed structure footprint. The calculated lowest eroded ground elevations adjacent to vertical walls are based on the longest wall length parallel to the shoreline of 26 feet to remain conservative and are presented in Table 1 for various existing ground elevations.

Table 1
Lowest Eroded Ground Elevation for Vertical Walls

Existing Ground Elevation [ft, NGVD]	Lowest Eroded Ground Elevation [ft, NGVD]
5.0	0.0
5.5	0.2
6.0	0.3
6.5	0.4
7.0	0.5

The lowest eroded ground elevation adjacent to vertical piles considers the storm surge elevation and pile diameter. The Site Plan does not currently show foundation piles. However, the Geotechnical Report (Nutting 2016) recommended the use of 16-inch auger piles to provide sufficient support for the proposed structure. The calculated eroded ground elevations adjacent

to vertical piles are based on multiple diameter/diagonal cross section (round/square) and are presented in Table 2 various existing ground elevations.

Table 2
Lowest Eroded Ground Elevation for Piles

Existing Ground Elevation [ft, NGVD]	Lowest Eroded Ground Elevation [ft, NGVD]				
	Pile Diameter/Diagonal Cross Section [in]				
	10	**12**	**14**	**16**	**18**
5.0	2.2	1.9	1.6	1.2	0.9
5.5	2.4	2.1	1.7	1.4	1.1
6.0	2.6	2.2	1.9	1.6	1.2
6.5	2.6	2.3	2.0	1.6	1.3
7.0	2.7	2.4	2.0	1.7	1.4

The geotechnical report states that an approximately 6 foot thick layer of medium dense sand with varying proportions of limestone fragments and shell fragments, followed by a hard to very hard limestone and cemented layer is present at the Project site. In locations where scour resistant limestone is present above the eroded levels presented in Tables 1 and Table 2, the top elevation of the limestone will be the maximum eroded level. The grade elevation at the test boring location is approximately +4.0 NGVD based on the Topographic Survey. For purposes of this analysis, limestone fragments and sand are not considered scour resistant. Therefore, no scour below the bottom of the limestone/sand layer (-2.0 feet NGVD) is expected.

Wave Loads Analysis

Piles

A wave load analysis for piles was completed using the methods outlined in the FEMA *Coastal Construction Manual*. The horizontal breaking wave loads on vertical piles (without load factors) were calculated based on the erosion analysis results summarized above. Wave loads for square and round piles of multiple dimensions are summarized in Table 3 below. All resultant loads act at the 100-year storm surge elevation stated above (+8.5 feet NGVD).

Table 3
Wave Loads for Single Piles

Pile Size [inches]	Square Pile [kips]	Round Pile [kips]
10	1.1	0.9
12	1.3	1.0
14	1.5	1.2
16	1.8	1.4
18	2.0	1.5

Walls

A wave load analysis for walls was completed using the methods outlined in the U.S. Army Corps of Engineers *Coastal Engineering Manual* (USACE 2011). Specifically, the Goda method for calculating breaking wave forces on vertical walls was utilized. The horizontal breaking wave loads on non-breakaway walls (without load factors) were calculated based on the erosion analysis results summarized above. The pressure distribution includes a horizontal force of approximately 0 pounds per linear foot at the top of the structure (+21'2" feet NGVD), a horizontal force of approximately 580 pounds per linear foot at the 100-year storm surge elevation (+8.5 feet NGVD), and horizontal force of approximately 575 pounds per linear foot at the toe of the eroded wall (+4.0 feet NGVD). The resultant force of the pressure distribution is 5,610 pounds per linear foot acting at an elevation of +9.3 feet NGVD.

The design criteria presented above can be utilized by the structural engineer to account for erosion and wave loads in the design of the walls and foundation of the proposed structure. However, additional design parameters may be required to satisfy the requirements for the design of public restrooms as outlined in the City of Key West Flood-Resistant Development Ordinance (§34-133).

If you have any questions, please do not hesitate to contact me.

Very truly yours,

Jordon Cheifet, P.E., CFM
FL #72876
Senior Project Engineer

CB&I Environmental & Infrastructure, Inc.
C.O.A. 9317

Reply to: Jordon Cheifet, P.E., CFM
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Enclosure

References

Federal Emergency Management Agency (FEMA). 2007. *Guidelines and Specifications for Flood Hazard Mapping Partners*.

Federal Emergency Management Agency. 2011. *Coastal Construction Manual.*

Federal Emergency Management Agency. 2005. *Flood Insurance Study for Monroe County, Florida*.

Topographic Survey. February 17, 2016. Florida Keys Land Surveying, Inc.

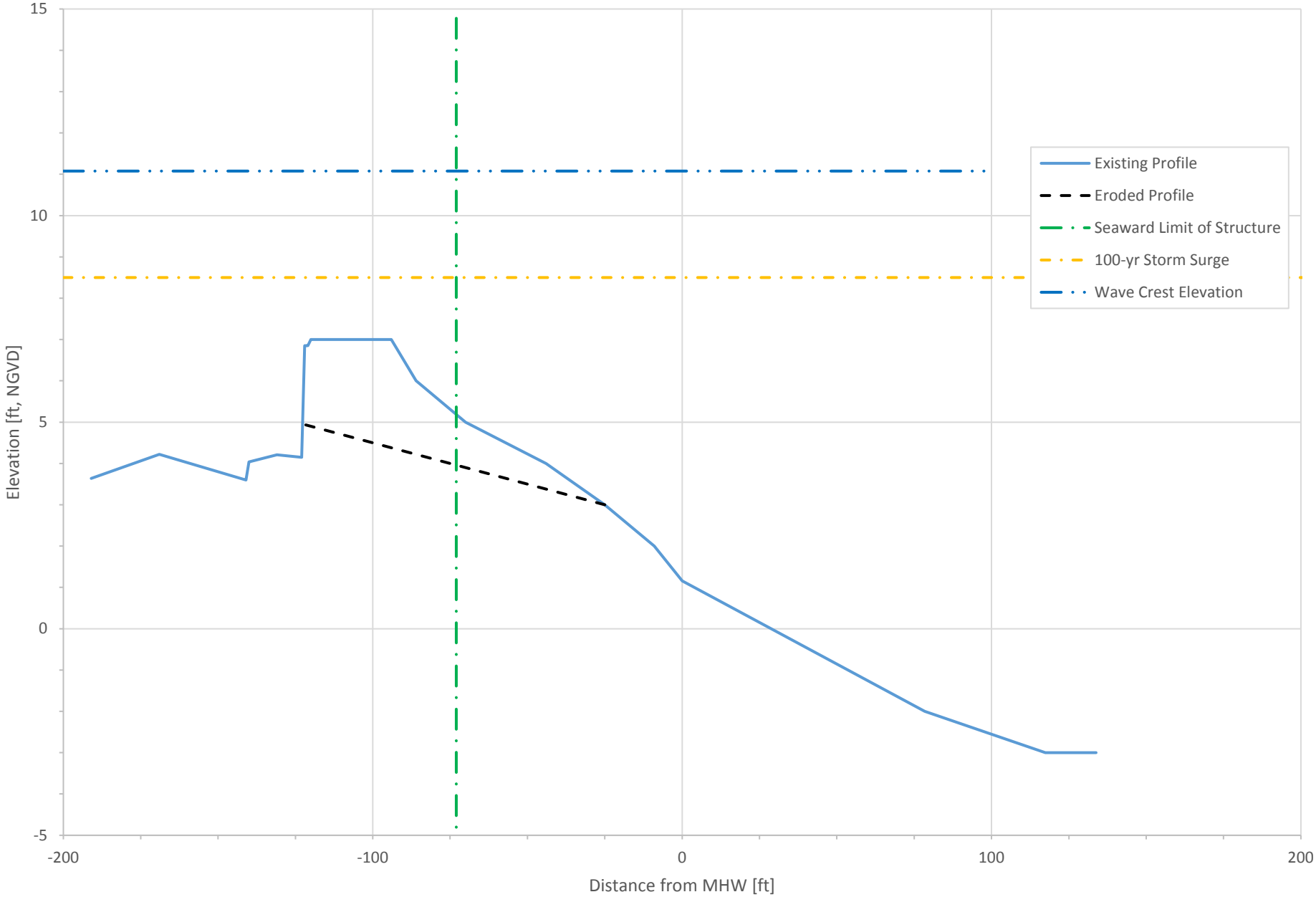
National Oceanic and Atmospheric Administration. 2016. *NGS Topobathy Lidar: Key West (FL)*.

Site Plan. March 21, 2017. Bermello, Ajamil & Partners, Inc.

Pre-Fab Bathroom and Detail. May 1, 2017. Bermello, Ajamil & Partners, Inc.

Nutting Engineers, Inc. May 2016. *Report of Geotechnical Exploration – Smathers Beach Restroom and Pump Station.*

Figure 1
100-yr Site-Wide Erosion Analysis



Sec. 34-133. - Flood-resistant development; buildings and structures.

(1) *Design and construction of buildings, structures and facilities exempt from the Florida Building Code*. Pursuant to section 34-126(2)(a) of this ordinance, buildings, structures, and facilities that are exempt from the Florida Building Code, including substantial improvement or repair of substantial damage of such buildings, structures and facilities, shall be designed and constructed in accordance with the flood load and flood-resistant construction requirements of ASCE 24. Structures exempt from the Florida Building Code that are not walled and roofed buildings shall comply with the requirements of section 34-139 of this ordinance.

(2) *Buildings and structures seaward of the coastal construction control line.* If extending, in whole or in part, seaward of the coastal construction control line and also located, in whole or in part, in a flood hazard area:

(a) Buildings and structures shall be designed and constructed to comply with the more restrictive applicable requirements of the Florida Building Code, Building Section 3109 and Section 1612 or Florida Building Code, Residential Section R322.

(b) Minor structures and non-habitable major structures as defined in F.S. § 161.54, shall be designed and constructed to comply with the intent and applicable provisions of this ordinance and ASCE 24.

(3) *Public restrooms*.

(a) Not structurally connected to another structure.

(b) Are permitted below the elevations specified in ASCE-24, Table 4-1, if constructed in accordance with the provision of this public restrooms section.

(c) Piles, pile caps, footings, mat or raft foundations, grade beams, columns and shear walls designed and constructed in accordance with ASCE/SEI 24-05, Section 4.5 shall not be required to meet the elevation requirements of ASCE-24, Table 4-1.

(d) Public restroom foundations must be designed and constructed in accordance with ASCE/SEI 24-05, Section 4.5, to minimize forces acting on that system.

(e) All new construction and substantial improvements shall be reasonably safe from flood damage:

(i) Be designed (or modified) and adequately anchored to prevent flotation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy;

(ii) Be constructed with materials resistant to flood damage;

(iii) Be constructed by methods and practices that minimize flood damages; and designed to account for the following:

(1) Waves breaking against the side or underside of the structure;

(2) Drag, inertia, and other wave-induced forces acting on structural members supporting elevated structures;

(3) Uplift forces from breaking waves striking the undersides of structures;

(4) Wave run-up forces including those deflected by the structure; and

(5) Erosion and scour.

(6) The structure must be protected to the maximum extent possible using an appropriate alternative flood protection technique, such as wet floodproofing provided that such structures represent a minimal investment and are designed to have a low damage potential with respect to the structure and contents.

(7) A registered professional engineer or architect shall develop or review the structural design, specifications and plans for the construction, and shall certify the design and methods of construction to be used.

iv. Be constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

(f) Materials used in new construction in flood hazard areas shall have sufficient strength, rigidity, and durability to adequately resist all flood-related and other loads during installation.

(g) Plumbing systems shall be designed and constructed to withstand flood waters and to prevent contamination of surface waters in accordance with the provisions of ASCE/SEI 24-05, Section 7.3.

(4) *Appliances.*

(a) Appliances servicing a building, to be replaced or substantially repaired more than 50 percent of its salvage value, shall be installed at a minimum height of design flood elevation.

(Ord. No. 13-05, § 2, 3-19-2013; Ord. No. 16-07, § 4, 5-17-2016)