



Addendum No.: Two

Date Of Addendum: 1/13/2017

CT DAS • Construction Services • Process Management and Procurement Unit

PHASE 1B ENCHANCEMENTS
SILVER SANDS STATE PARK
MILFORD, CT
BI – T –604

Revised Bid Due Date / Time:

February 1, 2017

1:00 PM

Previous Addendums: Addendum #1 dated 1/3/2017

TO: Prospective Bid Proposers:

This Addendum forms part of the "Contract Documents" and modifies or clarifies the original "Contract Documents" for this Project dated 11/28/17. Prospective Bid Proposers shall acknowledge receipt of the total number the Addenda issued for this Project on the space provided on Section 00 41 00 Bid Proposal Form.

Failure to acknowledge receipt of the total number the Addenda issued for this Project on the space provided on Section 00 41 00 Bid Proposal Form shall subject Bid Proposers to disqualification.

The following clarifications are applicable to drawings and specifications for the project referenced above.

Item 1:

Added Specification Section 01 20 00_Contract Considerations

Item 2:

Added Specification Section 01 23 13_Supplemental Bids

Discard the Bid Proposal that is in the specification and replace with the new one attached with the Supplemental Bid #1

Item 3:

Added Specification Section 02 45 90_Treated Tiber Piles

Item 4:

Added Specification Section 04 20 00_Unit Masonry

Item 5:

Added Specification Section 07 71 00_Roof Specialties

Item 6:

Added Specification Section 22 11 13_Facility Water Distribution Piping

Item 7:

Added 4" Conduits to Ticket Booth Drawing E103

Item 8:

Pre-bid Conference sheet attached

Item 9:

Cutoff date for RFI's is January 20, 2017 @ 12:00 PM



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All questions must be in writing (not phone or e-mail) and must be forwarded to the consulting Architect/Engineer (Philip Katz (203) 495 1652) with copies sent to the DAS Project Manager (Thomas Surprenant (860) 622-2605).

End of Addendum Two

Mellanee Walton, Associate Fiscal Administrative Officer
Department of Administrative Services
Office of Legal Affairs, Policy and Procurement
Bidding and Contracts Unit
450 Columbus Blvd., Suite 1302
Hartford, CT 06103

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Contract Documents and general provisions of the Contract, including General and Supplementary Conditions, other Division 01 Specification Sections, and Section 00 41 00 "Bid Proposal Form" apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
1. Allowances.
 2. Unit Prices.
- B. **Related Sections:** The following Sections contain requirements that relate to this Section:
1. Division 01 Section 01 23 13 "Supplemental Bids".
 2. Division 01 Section 01 26 00 "Contract Modification Procedures".
 3. Division 01 Section 01 29 76 "Progress Payment Procedures".
 4. Division 01 Section 01 77 00 "Closeout Procedures".

1.3 ALLOWANCES

- A. This Section includes administrative and procedural requirements for Allowances.
- B. **Related Sections:** The following Sections contain requirements that relate to this Section:
1. Division 01 Section 01 26 00 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
- C. **Cash Allowances:**
1. The Contractor's costs for unloading and handling, labor, installation costs, storage, insurance, overhead and profit and other expense related to the Allowance item shall be included in the Lump Sum Bid Amount and not in the Allowance unless stated otherwise in the Allowance Schedule of this section.
 2. **Architect/Engineer:**
 - a. Consult with Contractor for consideration of Products, suppliers and installers.
 - b. Select Products in consultation with the Project Manager and Agency Representatives and transmit decision to Construction Administrator.
 - c. Prepare Change Order.
 3. **Construction Administrator Responsibilities:**
 - a. Consult with Architect/Engineer, Contractor, Project Manager and Agency Representatives for consideration of Products, suppliers and installers.
 - b. Select Products in consultation with Architect/Engineer, Project Manager and Agency Representatives and transmit decision to Contractor
 - c. Prepare Change Order.
 4. **Contractor Responsibilities:**
 - a. Assist Architect/Engineer and Construction Administrator in selection of Products and Suppliers.
 - b. Obtain proposals from Suppliers and offer recommendations.
 - c. On notification of selection by Construction Administrator execute purchase agreement with designated supplier.
 - d. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
 - e. If the actual cost of an Allowance item is more or less than the given amount, the Contract Sum will be adjusted by Change Order.

1.4 UNIT PRICES - GENERAL

- A. This Section includes administrative and procedural requirements for unit prices.

- B. Related Sections:** The following Sections contain requirements that relate to this Section:
1. Division 01 Section 01 26 00 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
 2. Division 01 Section 01 29 76 "Progress Payment Procedures" for procedures for submitting Application for Payments.
- C. Definitions:**
1. **Unit Price:** Amount the General Contractor acknowledges in the Bid Proposal Form as a price per unit of measurement for materials or services as described in the Bidding Documents or in the Contract Documents.
- D. Procedures:**
1. Unit Prices included in the Contract Documents are to be used for determining compensation to the Contractor or Owner for changes to the scope of the work indicated in the Contract Documents, and included in the Lump Sum Contract Price. Special Unit Prices are for items complete, in place, and shall be inclusive of furnishing and installing of all material, labor, trucking, overhead, profit, equipment, hoisting, engineering, scaffolding, power hookups, protection, shop drawings, taxes, permits, appliances, delivery, insurance, supervision, cost of bond, etc. and shall remain in effect until completion of the Contract.
 2. **Unit Price:** Is identified by the Owner as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if the estimated quantities of Work required by the Contract Documents are increased or decreased.
 - a. Should the amount of the Work required be increased or decreased because of changes in the work ordered in writing by the Project Manager, the Contractor agrees that the following supplemental UNIT PRICES will be decreased 10% for a reduction of work. Each Unit Price shall include all equipment, tools, labor, permits, fees, etc., incidental to the completion of the work involved. All items marked with an asterisk (*) in the unit price schedules shall include the completion of the excavation, formation and compaction of sub-grade and the disposal of surplus or unsuitable materials in accordance with the Plans and Specifications or as directed by the Construction Administrator.
 3. The Owner reserves the right to reject the Contractor's measurement of work-in-place that involves use of established unit prices, and to have this work measured, at the Owner's expense, by an independent surveyor acceptable to the Contractor.
 4. **Defect Assessment:** Replace the Work, or portions of the Work, not conforming to the specified requirements. If, in the opinion of the Architect/Engineer, it is not practical to remove and replace the work the Architect/Engineer will direct an appropriate remedy or adjust the payment.
 5. **Unit Price Schedule:** A "Unit Price Schedule" is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials described under each unit price.

1.5 UNIT PRICE SCHEDULES

- A. Unit Price Schedule - Earth and Rock Excavation:** This Section includes administrative and procedural requirements for the following unit prices and provisions are to be included in and become part of this Contract to be used in evaluating additions to or deductions from the work called for in the specifications and/or plans.
1. Unless otherwise specified elsewhere in these documents, Contractors are to assume that all excavation is earth; however, if unspecified rock is encountered, it will be paid for at the given unit prices listed in Paragraph "C". Rock prices are net in that allowances for reduced quantities of earth are also included in the unit prices. The prices given include all costs for overhead, profit and rock surveys.
 2. Wherever rock to be excavated is encountered, the Contractor shall strip or expose the rock to such an extent that in the Owner's opinion the necessary measurements can be taken. The Contractor shall provide the Owner with a survey by a licensed land surveyor indicating top of rock elevations at points of intersection on a rectilinear grid with lines spaced sufficiently close to show accurately the rock surface contours. At the Owner's option, an additional survey may be furnished by the Owner from a licensed surveyor.
 3. If the conditions of the excavation work indicated are clearly of a special nature, the Contractor may ask the Owner for reconsideration of the established unit prices and if granted, the unit prices will not apply, and prices will be negotiated in accordance with Article 13 of the General Conditions.
- B. Definitions:**
1. "EARTH" - is defined as excavation shall include removal of all materials other than 'water' and 'rock'.
 2. "ROCK" - is defined as a boulder of one cubic yard or more in volume (1/2 cubic yard for a boulder in trenches), and rock in definite ledge formation and masonry structures of one cubic yard or more in volume, the removal of

which requires the use of mechanical equipment or the use of explosives. Rock removed by scarification or ripping method is considered as a separate classification under Paragraph 4.c.(1).

3. "ORIGINAL GRADE" - is defined as being the grade which exists at the time of Contract Award.
4. "ROUGH GRADE" - is defined as being the completed surface of required excavations greater than 13' in width.
5. "MASS" - excavation is to be considered as an open area whose minimum horizontal dimensions exceed 13'.
6. "TRENCH" - is defined as excavation is defined as the removal of material from areas 13 feet or less in its minimal horizontal dimensions and below the elevation of rough grade or original grade, whichever is lower.

C. Procedures:

1. Rock Excavation in Trenches: Basis for Horizontal Measurement:

- a. **Horizontal Measurements:** Will be taken between the vertical planes as defined below.
- b. **The Minimum Width of Trenches in Rock:** Will be taken as 3' 0".
- c. **Excavation For Walls Or Piers With Footings:** The measurements will be taken parallel to and one foot outside of the edges of the concrete footings as called for in the plans (i.e. for 4' 0" footing, rock will be taken as 6' 0" in width).
- d. **Excavation For Walls Or Piers Without Footings:** The limits of the excavation will be 1' 6" outside of the line of concrete at bottom as shown or called for in the plans (i.e. for a wall with a bottom thickness of 1' 0", the width of the trench will be considered to be 4' 0"). (Caissons are excluded from these measurements).
- e. **Excavation for Pipe Lines:** Will be measured at 2' 0" more than the nominal inside diameter of the pipe but in no case less than 3' 0" wide.
- f. **Excavation For Tanks, Vaults, Manholes, Pits, Etc.:** Will be measured as 2' 0" greater in both length and width or diameter than the actual exterior dimensions of the structures and this excavation is considered to be trench only if any measured horizontal dimensions is 13' or less.
- g. No allowance will be made for rock removed beyond the above limits.

2. Rock Excavation in Trenches - Basis for Vertical Measurement:

- a. To determine depth of trench, vertical measurements will be taken from original grade or rough grade, (whichever is applicable), to the bottom of required excavation. These measurements will define the maximum depths for payments.
- b. To determine quantity of rock in trench, vertical measurements will be taken from the top of rock as encountered in the trench to 12" below the bottom of required rock excavation. Any over excavation below the required elevation shall be filled with concrete or other material as specified at no cost to the Owner.
- c. No allowance will be made for rock removed beyond the above limits.

3. Earth Excavation in Trenches - Basis of Measurement (Horizontal & Vertical): The basis of measurements and allowance limit for earth excavation in trenches is identical to that indicated for rock excavation in trenches, except that there will be no allowance for 12" below the required elevation. In addition the following will prevail:

a. Maximum allowable widths for earth excavation in trenches without shoring:

Trench Depth - Classification	Add To Nominal ID Of Pipe Or To Footing Width
0 ft. - 6 ft.	3 ft.
Over 6 ft. - 10 ft.	5 ft.
Over 10 ft. - 15 ft.	7 ft.
Below 15 ft. deep the width of the trench shall be based on the individual case. The final depth of trench will determine the actual width for payment.	

- b. If shoring is required the measurement shall be taken between the exterior walls of the shoring not to exceed 4' plus the I.D. of the pipe (for all depths).
- c. To determine quantity of earth in trench, vertical measurements will be taken from the original or rough grade to actual bottom of earth excavation required.

4. Unit Prices - Earth and Rock Excavation (Basis for Payment): Prices include backfill with excavated material if it is suitable. Prices also include all excavation and disposal of all surplus or unsuitable material. Where replacement with the excavated material is prohibited or a particular backfill material is specified, the cost of the delivered replacement material in a volume equal to the above excavation pay limits minus the volume of the items installed in the trench shall be paid for a prior negotiated price. Prices do not include costs of shoring and de-watering but do include sloping for sides of excavation. Payment and credit amounts shall be determined in the

**SECTION 01 20 00
CONTRACT CONSIDERATIONS
PAGE 4 OF 5**

following manner: Widths and depths of trench excavation as indicated. The total quantity of earth or rock excavation encountered in each depth payment category shall be paid for at its respective unit price as shown below. For example, in a 15' trench the first 6' will be paid for at the 0' - 6' price; the next 4' will be paid for at the over 6' - 10' price and the next 5' will be paid for at the over 10' - 15' price. Thus three different price brackets will prevail.

a. EARTH EXCAVATION - HAND			UNIT	\$ ADD	\$ DEDUCT
(1)	In Trenches - 0' - 6'		C.Y.	36.00	28.80
(2)	In Trenches Below 6' Deep,		Prices Must Be Negotiated Before Work Is Started.		
b. EARTH EXCAVATION - MACHINE			UNIT	\$ ADD	\$ DEDUCT
(1)	Open Area	All Depths	C.Y.	18.81	15.05
(2)	In trenches	0' - 4' deep	C.Y.	14.27	11.40
	Over	0' - 10' deep	C.Y.	19.71	15.75
	Over	0' - 15' deep	C.Y.	35.00	28.00
	Over	0 - 20' deep	C.Y.	75.00	60.00
c. ROCK EXCAVATION			UNIT	\$ ADD	\$ DEDUCT
(1)	Open Areas, Rock Removed By Ripping (Any Amount), Net Rock		C.Y.	103.50	82.80
(2)	Open Areas, With Explosives -				
	Net Rock -	Total Quantity Up To 100	C.Y.	126.00	100.80
		Total Quantity Up To 1,000	C.Y.	60.00	48.00
		Total Quantity Up To 1,000 or more	C.Y.	28.00	22.40
(3)	In Trenches, Boulders, Remove By Machine		C.Y.	45.00	36.00
(4)	In Trenches, Ripping Of Rock By Machine		C.Y.	105.00	84.00
(5)	In trenches, with explosives				
	Net Rock	0' - 4' Deep	C.Y.	95.60	76.50
(6)	In trenches, with explosives				
	Net Rock	0' - 10' Deep	C.Y.	125.00	100.00
c. ROCK EXCAVATION (cont.)			UNIT	\$ ADD	\$ DEDUCT
(7)	In trenches, with explosives				
	Net Rock	0 - 15' Deep	C.Y.	150.00	120.00
(8)	In trenches, with explosives				
	Net Rock	Over 15' - 10' Deep	C.Y.	200.00	160.00
(9)	In trenches, with explosives -				
	Net Rock	0 - 20' Deep,	Prices Must Be Negotiated Before Start Of Work.		
(10)	Jack Holes (For Hydraulic Lift/Elevators)		L.F.	95.00	76.00
(11)	Open Or Mass Areas - If Explosives Are Prohibited				
	Net Rock		C.Y.	125.00	100.00
(12)	Trench Excavation - If Explosives Are Prohibited				
	Net Rock/With Rock Splitters And Jack Hammer or Hoe Ram		C.Y.	150.00	120.00

D. Unit Price Schedule - Miscellaneous:

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

B. **Unit Price Schedule - Miscellaneous:**

1.	MISCELLANEOUS Items	UNIT	\$ ADD	\$ DEDUCT
a.	Treated Timber Piles	L.F.		

2. Unit Prices shall be negotiated if there is a change in scope of work.

E. Unit Price Schedule - Alterations:

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

B. Unit Price Schedule – Alterations:

1.	ALTERATION ITEMS	UNIT	\$ ADD	\$ DEDUCT

2. Unit prices shall be negotiated if there is a change in scope of work.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 20 00

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements governing Supplemental Bids.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
1. Division 00 Section 00 41 00 Bid Proposal Form.
 2. Division 01 Section 01 20 00 "Contract Considerations".
 3. Division 01 Section 01 33 00 "Submittal Procedures".
 4. Division 01 Section 01 60 00 "Product Requirements".

1.3 DEFINITIONS

- A. **Definition:** "The monetary value stated in the Bid to be added to the amount of the Base Bid if the corresponding Work, as described in the Bidding Documents, is accepted." A Supplemental Bid is an amount proposed by bidders and stated on the Bid Proposal Form for certain work defined in the Bidding Documents that may be added to the Base Bid amount if the Owner decides to accept a corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
1. The cost for each supplemental bid is the net addition to the Contract Sum to incorporate the Supplemental Bid into the Work. Supplemental Bids are only accepted in the numerical order that they are listed on the Bid Proposal Form and never accepted out of numerical sequence. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

- A. **Coordination:** Modify or adjust affected adjacent Work as necessary to completely and fully integrate that Work into the Project.
1. Include as part of each Supplemental Bid, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not mentioned as part of the Supplemental Bid.
 2. Consider all work that must be accomplished for complete incorporation of the Supplemental Bids including modifications to Base Bid items.
 3. Include in lump sum prices for Supplemental Bids all costs of labor, materials, equipment, permits, fees, insurance, bonds, overhead, and profit.

4. Immediately after award of Contract, advise all necessary subcontractors, vendors, and suppliers as to which Supplemental Bids have been selected by Owner. Use all means necessary to alert those subcontractors, vendors, and suppliers involved as to all changes in the work caused by Owner's selection or rejection of Supplemental Bids.
 5. Coordinate related work and modify surrounding work to integrate work of each Supplemental Bid.
- B.** Execute accepted Supplemental Bids under the same conditions as other Work of this Contract.
- C. Schedule:** A "Schedule of Supplemental Bids" is included at the end of this Section. It contains all of Specification Sections, and applicable portions of Drawings and Details that govern the scope, quality, and execution of referenced in the Schedule contain all of the requirements necessary to achieve the Work described under each Supplemental Bid.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 SCHEDULE OF SUPPLEMENTAL BIDS

- A. Supplemental Bid No. 1:** Requires the installation of 32kVA grid connected photovoltaic system at the Silver Sands Maintenance Building:

Furnish and install photovoltaics modules on the roof of the pre-engineered maintenance building structure per the drawing E-104, E-503 and E-602. Provide all necessary conduit, wiring, supports, combiner boxes, etc. Furnish and install grid connected inverter system as shown on drawings E-103 and E-602. Provide all necessary equipment, conduit and wiring for a complete and operational system. Provide all necessary applications and letters and coordinate with the Utility company to make this a grid connected system. Refer to Specification 26 31 00 for additional information.

END OF SECTION 01 23 13

BID PROPOSAL FORM
FOR MAJOR & MINOR CAPITAL PROJECTS
WITH AN ESTIMATED CONSTRUCTION COST GREATER THAN \$500,000

CT DAS PROCUREMENT SERVICES
ON BEHALF OF
CT DAS DIVISION OF CONSTRUCTION SERVICES

FROM: _____ DATE: _____

PROPOSAL OF

*Complete Bidder's Legal Company Name
(As Registered with the State of Connecticut, Secretary of State)*

If "Doing Business As" then state Trade Name

Bidder's Address

Print Contact Person's Name And Title

To: Connecticut Department of Administrative Services - Procurement Services
450 Columbus Boulevard, Suite 1302
Hartford, CT 06103

For: BI-T-604
Phase 1B Enhancements
Silver Sands State Park
Milford, CT

Dear Commissioner:

- 1.0 In accordance with Chapter 60 Part II of the Connecticut General Statutes, as amended, and pursuant to, and in compliance with your Invitation to Bid, the Notice to Bidders, the Contract, including the conditions thereto, the Bid Security, I (we) propose to furnish the labor and/or materials, installed as required for the project named and numbered on this Bid Proposal Form, submitted herein, furnishing all necessary equipment, machinery, tools, labor and other means of construction, and all materials specified in the manner and at the time prescribed strictly in accordance with the provisions of the Contract including, but not limited to, the specifications and/or drawings together with all addenda issued by your authority and received prior to the scheduled closing time for the receipt of the bids, and in conformity with requirements of the Awarding Authority and any laws or Departmental regulations of the State of Connecticut or of the United States which may affect the same, for and in consideration of the price(s) stated on the said Bid Proposal Form, hereof.
- 2.0 **Lump Sum Base Bid:** This Lump Sum Base Bid by me (us) on the Bid Proposal Form *includes all work* indicated on the drawings and/or described in the specifications, except:
- 2.1 Work covered by **Supplemental Bids** as may be listed on the Bid Proposal Form and General Requirements.
- 2.2 Contingent Work covered by the **Unit Prices** included within the **General Requirements**.
- 3.0 I (we) **acknowledge and agree** to the following:
- 3.1 To use and accept the **Unit Prices** in Section 01 20 00 "Contract Considerations", Division 01 as provided by the Owner in evaluating either additions to or deductions from the Work.
- 3.2 To use and accept the **Allowances** in Section 01 20 00 "Contract Considerations", Division 1, as part of the Total Contract Sum as listed in Section 7.3 of this Bid Proposal form.

- 3.3 To use and accept the **Supplemental Bids** in Section 01 23 00 "Supplemental Bids", Division 1, as provided by the Contractor, when authorized by the Owner as scheduled in Section 7.6 of this Bid proposal form.
- 3.4 **Submission of Bid Proposal and other bid submittal requirements:**
All potential bidders must **electronically upload** to the Connecticut Department of Administrative Services (CT DAS) and/or **submit** to CT DAS Procurement Services (as applicable) including but not limited to **Affidavits and Certifications**.
For the requirements to submit the Bid Proposal, and submit and/or electronically upload Affidavits and Certifications, and other bidding documents, see **Article 1 of 00 21 19 Notice to Bidders - (Major & Minor Capital Projects Greater than \$500,000)**. Please note that electronic uploading of Affidavits and Certifications is the preferred method for submission.
- 3.5 To hold the bid price for ninety (90) calendar days and any extensions caused by the Contractor's delays in required submissions. The Contractor and the State may mutually agree to extend this period. The agreement to extend the 90-day period may occur after the expiration of the original 90-day period.
The apparent low bidder is required to submit key supporting documents as noted under the caption **Bid Submittal Time Line** at the end of this Section 00 41 00, within ten (10) calendar days of the bid opening, and to submit their Affirmative Action Plan to CHRO within fifteen (15) calendar days of bid opening. If there are any delays in the receipt of these materials then the Bid shall remain valid for the same additional number of days. For example, if the materials are submitted four (4) days later; then the bid shall remain valid for ninety-four (94) days.
- 3.6 To comply with the Department of Correction's **Security Regulations For Contract Forces**, Section 00 73 63.
- 4.0 **Bid Proposal Form:** This Bid Proposal Form is submitted to and in compliance with the foregoing and following conditions and/or information:
- 4.1 **AWARD:**
- 4.1.1 All proposals shall be subject to provisions of **Article 1 of the Notice to Bidders** and for purpose of award, consideration shall be given only to Bid Proposals submitted by qualified and responsible bidders.
- 4.1.2 The award shall be made on the **lowest Lump Sum Bid** as stated in Section 7.3 of this Bid Proposal Form and any or all **Supplemental Bids** as stated in Section 7.6 of this **Bid Proposal Form**, taken sequentially, as applicable, provided funds are available.
- 4.1.3 In the event of any **discrepancy** between the amount written in words and the amount written in numerical figures, the amount written in words shall be controlling.
- 4.2 **COMMENCEMENT AND ACCEPTANCE (ARTICLE 4 GENERAL CONDITIONS):**
- 4.2.1 The General Contractor shall commence Work within **fourteen (14) calendar days** after receiving "Construction Start Date and Notice To Proceed" by the Commissioner or the authorized representative and continue for Four Hundred **(400)** calendar days for completion of the project.
- 4.3 **LIQUIDATED DAMAGES: (ARTICLE 8, GENERAL CONDITIONS):**
- 4.3.1 The General Contractor shall be assessed **\$2,099.00** per day for each calendar day *beyond* the Date established for Substantial Completion of the Contract according to the **Contract Time** as defined in Article 1.28 of the General Conditions, and not otherwise excused or waived pursuant to the Contract Documents, as defined in Article 1.23 of the General Conditions.
- 4.3.2 The General Contractor shall be assessed **\$2,027.00** per day for each calendar day *beyond* ninety (90) days *after* the date of said Substantial Completion that the Contractor fails to achieve **Acceptance**, as defined in Article 1.1 of the General Conditions and not otherwise excused or waived as described above
- 4.4 **CONTRACTOR'S INSURANCE REQUIRED: (ARTICLE 35, GENERAL CONDITIONS):**
- 4.4.1 The **limits of liability** for the Insurance required for this project shall be those listed in Article 35 of the General Conditions. **NOTE:** There is a new requirement regarding **commercial general liability (CGL) insurance:** The State of Connecticut Attorney General's Office now requires all selected firms to provide an endorsement to the CGL insurance stating that the State of

Connecticut is an additional insured. Please be advised that a blanket endorsement is not acceptable.

4.4.2 SPECIAL HAZARDS INSURANCE REQUIRED:

None Required

4.4.3 BUILDERS RISK INSURANCE:

The General Contractor shall maintain Builder's Risk insurance providing coverage for the entire Work at the project site, and shall also cover portions of the Work located away from the site but intended for use at the site, and shall also cover portions of the Work in transit. Coverage shall be written on an All-Risk, Replacement Cost, and completed Value Form basis in an amount at least equal to the projected completed value of the Work and the policy shall state that the State of Connecticut shall be named as a loss payee not as an additional insured for these coverages.

4.4.4 OWNERS AND CONTRATORS PROTECTIVE LIABILITY INSURANCE:

The General Contractor shall maintain **Owner's and Contractor's Protective Liability** insurance providing a total limit of **\$1,000,000** for all damages arising out of bodily injury or death of persons in any one accident or occurrence and for all damages arising out of injury or destruction of property in any one accident or occurrence and subject to a total (aggregate) limit of **\$2,000,000** for all damages arising out of bodily injury to or death of persons in all accidents or occurrences and out of injury to or destruction of property during the policy period. This coverage shall be for and in the name of the State of Connecticut.

4.4.5 UMBRELLA LIABILITY INSURANCE:

This project requires **Umbrella Liability Insurance**. Provide an endorsement to the Umbrella Liability Insurance stating that the State of Connecticut is an additional insured. Select the correct **Umbrella Limit** using the "Umbrella Liability Insurance Table" below.

Umbrella Liability Insurance Table:			
Contract Value			Umbrella Limit
\$1.00	to	\$500,000.00	\$1,000,000.00
\$500,000.01	to	\$1,000,000.00	\$2,000,000.00
\$1,000,000.01	to	\$10,000,000	\$5,000,000.00
\$10,000,000.01	to	\$30,000,000	\$10,000,000.00
\$30,000,000.01	to	\$80,000,000	\$15,000,000.00
\$80,000,000.01	to	\$150,000,000	\$20,000,000.00
\$150,000,000.01	to	\$300,000,000	\$25,000,000.00

4.5 NOT USED

4.6 The General Contractor on this project shall be required to award not less than the percentage stated in the Invitation to Bid to contractors who are currently certified and eligible to participate under the State of Connecticut Set-Aside Program for **Small Business Enterprise (SBE)** contractors, including the percentage stated in the Invitation to Bid to currently certified and eligible **Minority Business Enterprise (MBE)** contractors, in accordance with Connecticut General Statutes Section 4a-60g.

4.6.1 This requirement *must be met even if* the **General Contractor** is *certified and eligible* to participate in the **Small Business Set-Aside Program**. To facilitate compliance with this requirement for set-aside subcontractors, the three (3) **apparent low bidders** will have ten (10) calendar days from the date of bid opening within which to submit a **list of certified set-aside contractors** to be used on this project along with the **dollar amounts** to be paid to each, on the form provided (Section 00 73 27 Set-Aside Contractor Schedule), and a copy of their **current certification** must be attached. This information will be considered as part of your Bid Proposal Form and **failure** to comply with any portion of this requirement within the ten (10) days, including but not limited to **failure** to list or meet the necessary dollar amount or percentage of the bid price will be cause to **reject your bid**.

4.6.2 The **percentage of the work performed by the CT DAS Certified Small Business Enterprise and Minority Enterprise contractors and subcontractors** on this project shall not be less than

the percentage noted in the **Commission on Human Rights (CHRO) Regulation Section 00 73 38 subsection 5.1** of the completed Contract Sum of the Work with its own forces.

4.7 BIDDER'S QUALIFICATION STATEMENT AND OBJECTIVE CRITERIA FOR EVALUATING QUALIFICATIONS OF BIDDERS:

4.7.1 Information in regards to the General Contractor's and the Named Subcontractor's Bidder's Qualification is submitted and is made part of this Bid Proposal Form. **Note: Individual Specification Sections may contain General Contractor and/or Subcontractor Qualification requirements that exceed those in Section 00 45 15, "Objective Criteria Established for Evaluating Qualifications of Bidders."**

4.7.1.1 The **General Contractor** is required to complete the **General Contractor Bidder's Qualification Statement** in Section 00 45 14.

4.7.1.2 Any **Named Subcontractor** as listed in Table 7.5 of this Bid Proposal Form is required to complete the **Named Subcontractor Bidder's Qualification Statement** in Section 00 45 17. To facilitate compliance with this requirement, the three (3) apparent low bidders will have **ten (10)** calendar days, from the bid opening date, to submit the completed **Named Subcontractor Bidder's Qualification Statement** as required in Section 00 45 17. This information will be considered as part of your Bid Proposal Form and failure to comply with any portion of this requirement will be **cause to reject** your bid.

4.7.2 The **Objective Criteria for Evaluating Bidders** that are included in Division 0, Section 00 45 15, of this Project Manual, is to assure that the State of Connecticut will secure the "lowest responsible and qualified bidder" who has the ability and capacity to successfully complete the Bid Proposal Form and the Work.

4.8 NONDISCRIMINATION AND LABOR RECRUITMENT:

4.8.1 The Contract is subject to the provisions of Executive Order No. Three of Governor Thomas J. Meskill, promulgated June 16, 1971, concerning labor employment practices, Executive Order No. Seventeen of Governor Thomas J. Meskill, promulgated February 15, 1973, concerning the listing of employment openings and Executive Order No. Sixteen of Governor John G. Rowland promulgated August 4, 1999, concerning violence in the workplace, all of which are incorporated into and are made a part of the Contract as if they had been fully set forth in it. At the Contractor's request, the Client Agency shall provide a copy of these orders to the Contractor. The Contract may also be subject to Executive Order No. 7C of Governor M. Jodi Rell, promulgated July 13, 2006, concerning contracting reforms and Executive Order No. 14 of Governor M. Jodi Rell, promulgated April 17, 2006, concerning procurement of cleaning products and services, in accordance with their respective terms and conditions.

4.9 FEDERAL & STATE WAGE DETERMINATIONS:

4.9.1 The U. S. Secretary of Labor's latest decision and the State of Connecticut Wage Schedule are all incorporated in the documents. The higher rate (Federal or State) for any given occupation shall prevail. At the time of bidding, the bidder agrees to accept the current prevailing wage scale, as well as the annual adjustment to the prevailing wage scale, as provided by the Connecticut Department of Labor.

4.10 CERTIFICATION OF BIDDER REGARDING EQUAL EMPLOYMENT OPPORTUNITY & NON-SEGREGATED FACILITIES:

4.10.1 The General Contractor and Subcontractors are hereby advised that upon acceptance of their bids they are obligated to fill out within seven (7) calendar days the certification required pursuant to Executive Order No. 11246, and agree to certify to the compliance of non-segregated facilities.

4.11 EQUALS AND SUBSTITUTION REQUESTS PROCEDURES:

4.11.1 All submissions requesting "Equals and/or Substitutions" shall be made by the Contractor in accordance with **Article 15** of the **General Conditions** and **Section 01 25 00** of the **General Requirements**. All submissions shall contain all the information necessary for the CT DAS Division of Construction Services (DCS) to evaluate the submission and the request. Failure to submit sufficient information to make a proper evaluation, including submittal of data for the first manufacturer listed as well as the data for the "Equals and/or Substitutions" proposed, shall result in a **rejection** of the submission and request. Upon receipt of the submission and request the Division of Construction Services shall notify the Contractor the request has been received and as soon as possible shall render a decision on such submission and request.

- 4.11.2 **Pre-Bid Opening Substitution of Materials and Equipment:** The Owner will consider requests for equals or substitutions *if* received **fourteen (14) days prior** to the Bid Opening. The **Equal or Substitute Product Request Form 7001** must be used to submit request. This form may be found on the **DCS Website** (www.ct.gov/dcs) in the **DCS Library**, located at the top of the webpage, under "7000 Construction Phase Forms".
- 4.11.3 Request for Equal or Substitution shall be submitted to the **DCS Project Manager and Architect or Engineer**.
- 4.11.4 Any substitution request not complying with requirements will be denied. Substitution request sent *after* the **deadline** will be denied.
- 4.11.5 An **Addendum** shall be issued to inform all prospective bidder of any accepted substitution in accordance with our addenda procedures.
- 4.11.6 No extension of time will be allowed for the time period required for consideration of any Substitution or Equal.
- 4.11.7 **Post Contract Award Substitution Of Materials And Equipment:** All Requests For "Equals And Substitutions" *after* the Award of the Contract shall be made *only* by the **General Contractor** in accordance with Article 15, Materials: Standards, Section 00 72 00 General Conditions Of The Contract For Construction.

5.0 ACCOMPANYING THIS PROPOSAL IS:

5.1 A **CERTIFIED CHECK** drawn to the order of – Treasurer, State of Connecticut, in the which it is understood shall be cashed and the proceeds thereof used so far as may be necessary to reimburse the State of Connecticut for losses and damages arising by virtue of my (our) failure to file the required Bonds and execute the required contract if this proposal is accepted by the Awarding Authority.

OR

5.2 A **BID BOND** having as surety thereto a Surety Company or Companies authorized to transact business in the State of Connecticut and made out in the penal sum of 10% of the bid.

5.3 **CHECKLIST OF INCLUDED ITEMS WITH BID PROPOSAL AT TIME OF BID PROPOSAL SUBMITTAL:**

IMPORTANT:		
A.	All forms below must be either uploaded to the CT DAS website or included when you submit your bid package.	
B.	Failure to submit any of items marked below with an asterisk (*) shall cause rejection of the bid and shall not be considered a minor irregularity under CGS 4b-95.	
Item Checklist	Include the following in the Bid Package to CT DAS Procurement Services:	Form Location
1*	<input type="checkbox"/> Bid Proposal Form	00 41 00
2	<input type="checkbox"/> Certificate (of authority)	00 40 14
3*	<input type="checkbox"/> Department of Administrative Services Pre-qualification Certificate	00 40 15
4*	<input type="checkbox"/> Department of Administrative Services Update Statement	00 40 15
5*	<input type="checkbox"/> Standard Bid Bond or Certified Check	00 43 16
6*	<input type="checkbox"/> General Contractor Bidder's Qualification Statement	00 45 14
7	<input type="checkbox"/> SEEC Form 10	SEEC Website
8	<input type="checkbox"/> Named Subcontractor's CT DAS Prequalification Certificate	CT DAS Website
Item Checklist	Include the following in the Bid Package to CT DAS Procurement Services or upload the following to the CT DAS Website prior to the time of the Bid Proposal Submission:	Form Location
1*	<input type="checkbox"/> Ethics Affidavit (Regarding State Ethics) – OPM Ethics Form 6	OPM Website
2*	<input type="checkbox"/> Gift and Campaign Contribution Certification – OPM Ethics Form 1	OPM Website
3*	<input type="checkbox"/> Consulting Agreement Affidavit – OPM Ethics Form 5	OPM Website
4	<input type="checkbox"/> Iran Certification – OPM Ethics Form 7	OPM Website

5	<input type="checkbox"/>	Nondiscrimination Certification – Form A, B, C, D, or E	OPM Website
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6.0 **Bid Proposal Declaration:** I (we), the undersigned, hereby declare that I am (we are) the only person(s) interested in the Bid Proposal and that it is made without any connection with any other person making any Bid Proposal for the same work. No person acting for, or employed by, the State of Connecticut is directly or indirectly interested in this Bid Proposal, or in any Contract which may be made under it, or in expected profits to arise therefrom. This Bid Proposal is made without directly or indirectly influencing or attempting to influence any other person or corporation to bid or refrain from bidding or to influence the amount of the Bid Proposal of any other person or corporation. This Bid Proposal is made in good faith without collusion or connection with any other person bidding for the same work and this proposal is made with distinct reference and relation to the plans and specifications prepared for this Contract. I (we) further declare that in regard to the conditions affecting the Work to be done and the labor and materials needed, this Bid Proposal is based solely on my (our) own investigation and research and not in reliance upon any representations of any employee, officer or agent of the State.

7.0 **Class of Work:** Each **Class of Work** set forth in a separate section of the specifications pursuant to this Section shall be a **subtrade** designated in Table 7.5 of this Bid Proposal Form and shall be the matter of a **subcontract** made in accordance with the procedure set forth in this chapter.

7.1 The undersigned proposes to furnish all labor and materials required for

Project Number: BI-T-604
Project Title: Phase 1B Enhancement
 Silver Sands State Park
 Milford, CT

In accordance with the accompanying Plans and Specifications

Prepared by: Stantec Consulting Services, Inc.
 Stantec Architecture Inc.
 55 Church Street, Suite 601
 New Haven, CT 06510

 Engineer/Architect

for the Contract Sum specified in **Section 7.3 Proposed Contract Price** subject to **additions** and **deductions** according to the terms of the specifications:

7.2 This Bid Proposal includes _____ number of **Addenda/Addendum**.

7.2.1 The **Contractor is to fill in item 7.2 above**, acknowledging the number of Addenda that the Contractor is including in the Bid Proposal Form. Failure to acknowledge all **addenda** in the space provided in the Bid Proposal Form shall be cause for **rejection** of the bid.

7.3 **THE PROPOSED CONTRACT PRICE IS AS FOLLOWS:**

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(Place figures in appropriate boxes.)

DOLLARS

(Written Amount)

7.3.1 In accordance with Section 4.6, not less than the percentage stated in the Invitation to Bid must be awarded to Certified **Small Business Enterprise (SBE)**, including the percentage stated in the Invitation to Bid for Certified **Minority Business Enterprises (MBE)**. Failure to meet this requirement will be cause to **reject** your Bid.

7.4. **NOT USED**

NAMED SUBCONTRACTOR CLASSES OF WORK:

7.5.1 When a box is checked in **Table 7.5**, it indicates that this Project has plans and specifications detailing all labor and materials for a **Class of Work** estimated to exceed **Twenty-Five Thousand dollars (\$25,000)** that shall be furnished by the Bidder. The Bidder **shall** provide **all** the following Information for each **Class of Work**:

.1 If the **"None"** box is checked in **Table 7.5**; then a Bidder **shall not** complete **Table 7.5**;

- .2 Name of Subcontractor (The General Contractor shall Name the Subcontractor with the largest Proposed Subcontract Value for each Class of Work);
- .3 Proposed Value of Subcontract (Amount Dollars);
- .4 Labor & Material Payment Bond (Percentage);
- .5 Performance Bond (Percentage);
- .6 Total Value of Class of Work (Amount Dollars).

Table 7.5 - Named Subcontractor Classes of Work	
<input type="checkbox"/> None, Project has <u>no</u> Classes of Work estimated to exceed Twenty-Five Thousand dollars (\$25,000).	
Classes of Work Descriptions:	Named Subcontractors Information:
<input checked="" type="checkbox"/> Masonry Work:	
Name of Masonry Subcontractor:	
Proposed Value of Masonry Subcontract:	\$ _____
Labor & Material Payment Bond:	_____ %
Performance Bond:	_____ %
Proposed Total Value of Masonry Class of Work:	\$ _____
<input checked="" type="checkbox"/> Electrical Work:	
Name of Electrical Subcontractor:	
Proposed Value of Electrical Subcontract:	\$ _____
Labor & Material Payment Bond:	_____ %
Performance Bond:	_____ %
Proposed Total Value of Electrical Class of Work:	\$ _____
<input checked="" type="checkbox"/> Mechanical Work: (except HVAC)	
Name of Subcontractor:	
Proposed Subcontract Price:	\$ _____
Labor & Material Payment Bond:	_____ %
Performance Bond:	_____ %
Proposed Total Value of Mechanical Class of Work:	\$ _____
<input checked="" type="checkbox"/> HVAC:	
Name of Subcontractor:	
Proposed Subcontract Price:	\$ _____
Labor & Material Payment Bond:	_____ %
Performance Bond:	_____ %
Proposed Total Value of HVAC Class of Work:	\$ _____

Note: Failure of a Bidder to properly complete the above Table 7.5 according to the Instructions shall be cause for rejection of the bid.

- 7.5.2 No person whose subcontract *exceeds* five hundred thousand dollars in value may perform work as a subcontractor on a project, which project is estimated to cost more than five hundred thousand dollars and is paid for, in whole or in part, with state funds, *unless, at the time of bid submission*, the person is prequalified in accordance with section 4a-100, as amended. "Prequalified" includes the contractor's or substantial subcontractor's prequalification classifications, aggregate work capacity ratings and single project limits.
- 7.5.3 The **General Contractor** *may* list itself together with its price (failure to provide both will be cause for rejection), *if* it customarily performs any of the Classes Of Work listed in Table 7.5 and is Prequalified by CT DAS for the Class Of Work at the time of the Bid Due date if the work is greater than \$500,000.
 - .1 *If a General Contractor* intends to use a subcontractor to perform any portion of the Named Classes of Work, including circumstances where the subcontractor is a Small Business Set-aside (SBSA) such as a Small Business Enterprise (SBE) or a Minority Business Enterprise (MBE), *then* it must list the Subcontractor or Set Aside Subcontractor as the case may be, for such Class of Work. A **General Contractor** may **not** substitute itself for any of the Named Classes of Work. If the General Contractor intends to use more than one Subcontractor to perform the Named Class of Work, then it shall indicate the Subcontractor name and Subcontract Value for the largest single Named Subcontractor.
 - .2 *If a General Contractor* leaves the spaces for a specific "**Class of Work Description**" *completely blank*, it will be *assumed* that the General Contractor will perform **all the Work for that "Class of Work"**.
- 7.5.4 *If a General Contractor* requires a **Performance and/or Labor and Material Payment Bond**, *then* the General Contractor must indicate in **Table 7.5** which of the Named Subcontractors are subject to this requirement. The amount (%) shall not exceed the Named Subcontractor's **Proposed Subcontract Value** as listed in-**Table 7.5**.
- 7.5.5 The undersigned *agrees* that each of the **Named Subcontractors** listed in **Table 7.5** of the Bid Proposal Form will be used for the "**Class of Work**" indicated at the **Proposed Subcontract Value dollar amount stated**, *unless* a **substitution** is permitted by the awarding authority as provided for in section **00 21 19 Notice to Bidders**.
- 7.6 Any **Supplemental Bids** listed in schedule 7.6.1, *if* accepted by the Owner, will be taken cumulatively and in numerical order as scheduled. No Supplemental Bid will be skipped or taken out of numerical order as scheduled. Supplemental Bids: Division 1, Section 01 23 13 of the **General Requirements** identifies and describes the Supplemental Bids as shown in Schedule 7.6.1.

SCHEDULE 7.6.1 – SUPPLEMENTAL BIDS	
Supplemental Bid No.:	1 Provide all labor, material and equipment to complete the Work in accordance with Division 1, Section 01 23 13.
ADD: _____	Dollars \$ _____ <i>(Written Amount)</i>

- 7.7 **Contractor Provided Unit Prices** are not needed for this project.
 - 7.8 The undersigned agrees that *if* selected as the General Contractor, I (we) shall, within **fifteen (15)** calendar days (legal State holidays excluded) *after* notification thereof by the awarding authority, *execute* a **Contract** in accordance with the terms of this Bid Proposal Form and Contract.
 - 7.9 The undersigned agrees and warrants that they have made **good faith efforts** to employ **minority business enterprises** as **Subcontractors** and **suppliers** of materials under such Contract and shall provide the Commission on Human Rights and Opportunities with such information as is requested by the Commission concerning their **employment practices and procedures** as they relate to the current provisions of the Connecticut General Statutes governing Contract requirements.
- 8.0 **Confidentiality of Documents:**

- 8.1 The undersigned agrees that if not selected as the General Contractor for this project, all plans and specifications in their possession for the project shall be destroyed.
- 8.2 The undersigned agrees that if selected as the General Contractor for this project:
- 8.2.1 The plans and specifications shall not be disseminated to anyone except for construction of this project.
- 8.2.2 The following provision shall be included in all of its contracts with subcontractors and sub-consultants:
- "Any and all drawings, specifications, maps, reports, records or other documents associated with the contract shall only be utilized to the extent necessary for the performance of the work and duties under this contract. Said drawings, specifications, maps, reports, records and other documents may not be released to any other entity or person except for the sole purpose of the work described in this contract. No other disclosure shall be permitted without the prior written consent of the Division of Construction Services. When any such drawings, specifications, maps, reports, records or other documents are no longer needed, they shall be destroyed."
- 8.2.3 Upon completion of the construction and the issuance of a certificate of occupancy, the plans and specifications shall be returned to the Division of Construction Services, or destroyed, or retained in a secure location and not released to anyone without first obtaining the permission of the Division of Construction Services.
- 9.0 **Duly Authorized Signature:** A duly authorized representative of the Bidder or Bidder's partnership, firm, corporation or business organization must sign all Bid Proposals Forms.

Important Note: No Facsimile Signature Is Permitted.
All Information Below Is To Be Filled In By The Bidder.

Project Number BI-T-604

Contact Person _____

Firm Name _____

Complete BIDDER'S LEGAL COMPANY NAME
(AS REGISTERED WITH THE STATE OF CONNECTICUT, SECRETARY OF STATE)

General Contractor's State of Connecticut, D.C.P. License/ Registration No. _____
(Applicable for Threshold Building projects only. Insert "N/A" if not applicable. Refer to page 1)

Firm Federal Employer Identification Number _____

Firm CT Tax Registration Number _____

Firm Address _____
Street City State Zip Code

Telephone Number _____

FAX Number _____

E-mail Address _____

Type of Business (check one): Corporate Seal, *if a Corporation*

Corporation

Limited Liability Corporation (LLC)

Partnership



____ Sole Proprietor

____ Doing Business As (d/b/a), if yes, provide complete name below:

Provide Exact Wording on Corporate Seal below:

This Bid Submission is only for Contractors who are Certified in the CT DAS Prequalification Classification noted in the Invitation to Bid.

A Certificate (of Authority) (Section 00 40 14) must be submitted with your Bid Proposal.

Signed this _____ day of _____ 20_____

Bidder's Signature

Duly Authorized	Title
Print Name	Date

The apparent three low bidders are required to submit key supporting documents as noted below, while the apparent low bidder is required to submit his Affirmative Action Plan to CT DAS CHRO and his “General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities” to CT DEEP as noted below. If there are any delays in the receipt of these materials then the Bids shall remain valid for the same additional number of days. For example, since the apparent three low bidders are required to hold the bid price for ninety (90) calendar days and any extensions caused by the Contractor's delays in required submissions, if materials are submitted four (4) days later, then the bid shall remain valid for ninety-four (94) days.

Failure to meet the below stated deadlines may result in rejection of the bid at the sole discretion of the Commissioner of Administrative Services.

NOTE: All of the following submittals shall be submitted directly to:

CT DAS Procurement Services
165 Capitol Avenue, 5th Floor East, Hartford, CT 06106

Bid Submittal Time Line:

SUBMITTALS DUE WITHIN 10 CALENDAR DAYS AFTER SET-ASIDE CONTRACTOR SCHEDULE REQUEST

(From the Apparent Three Low Bidders):

1. Section 00 73 27 Set-Aside Contractor Schedule
2. Listing of certified set aside contractors Subs with name, address, amount and whether a subcontractor or a supplier or both
3. CT DAS Set-Aside Subcontractor Certificate of Eligibility (SBEs & MBEs)
4. Section 00 45 17 Named Subcontractor Bidder's Qualification Statements
5. Named Subcontractor's CT DAS Prequalification Certificate, when applicable

SUBMITTALS DUE WITHIN 15 CALENDAR DAYS AFTER REQUEST FOR AFFIRMATIVE ACTION PLAN AND EMPLOYMENT INFORMATION LETTER

(From the Apparent Low Bidder):

1. Affirmative Action Plan to CT DAS CHRO
2. Affirmative Action Plan Transmittal Letter Copy to CT DAS Procurement Services
3. Section 00 73 44 Wage Certification to DOL
4. On your letterhead, list of all named subcontractors, address and contact person
5. Scope Review conducted

NEW: SUBMITTAL DUE WITHIN 10 BUSINESS DAYS AFTER REQUEST FOR "GENERAL PERMIT FOR THE DISCHARGE OF STORMWATER AND DEWATERING WASTEWATERS FROM CONSTRUCTION ACTIVITIES" LETTER (From the **Apparent Low Bidder**, for projects involving **one [1] acre or more of soil disturbance**):

1. Registration and plans for the "General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities (CT DEEP-WPED-GP-015)" (see Section 00 21 19 Notice to Bidders for more information) to CT Department of Energy and Environmental Protection (CT DEEP);
2. Copy of registration and transmittal letter for the "General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities" to CT DAS Procurement Services.

SUBMITTALS DUE WITHIN 10 BUSINESS DAYS AFTER THE LETTER OF INTENT:

1. Section 00 62 16: Insurance Certificate Form
2. Section 00 92 10: Performance Bond
3. Section 00 92 10: Labor & Material Bond
4. Section 00 92 10: Surety Sheet
5. Power of Attorney from the Surety Company
6. Section 00 40 14: Certificate (of authority)
7. Section 00 62 16.1: Asbestos Abatement Liability Insurance (for asbestos abatement only)
8. Motor Vehicle Pollution Liability for Asbestos Abatement (for asbestos abatement only)
9. Section 00 92 30: Verified Nonresident General/Prime Contractors must submit a copy of their "Notice of Verified Status" from the CT Department of Revenue Services (DRS). Unverified Nonresident General/Prime Contractors must submit a copy of Form AU-965 "Acceptance of Surety Bond" from the DRS.
10. Section 00 92 10: Bidder's Certificate: Financial Position & Corporate Structure
11. Section 00 52 03: Contract
12. Section 00 52 73: Subcontract Agreement Form (Named & Listed)
13. Affidavit Regarding State Ethics – for each Named Subcontractor
14. Certificate of Legal Existence from Corporations

SECTION 02 45 90 – TREATED TIMBER PILES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 DESCRIPTION OF WORK

A. General

- 1. The work covered by this Section, without limiting the generality thereof, consists of furnishing all plant, labor, equipment, appliances and material and performing all operations in connection with the furnishing and installing 25-ton design capacity treated timber bearing piles at the locations and to the lines and grades shown on the drawings.
- 2. Prior to the start of production work, drive ten (10) piles throughout the site to confirm anticipated pile lengths.

1.3 DEFINITIONS AND REFERENCE STANDARDS:

- A. Owner: The Owner is The State of Connecticut Department of Energy and Environmental Protection (DEEP).
- B. Engineer: The Engineer is the firm of Stantec Consulting Services Inc. The Engineer, or his authorized representative, is the authorized representative of the Owner for the work covered by this Section.
- C. Contractor: The Contractor is the person or organization identified in the Agreement as being responsible for the work under this Section. The term Contractor shall also refer to an authorized representative of the Contractor.

- D. ASTM: Specification of the American Society for Testing and Materials.
AWPA: American Wood Preservative Association
- E. Code: State of Connecticut Building Code.

1.4 QUALITY ASSURANCE:

- A. Comply with all rules, regulations, laws and ordinances of the State of Connecticut, and of all other authorities having jurisdiction. All labor, materials, equipment and services necessary to make work comply with such requirements shall be provided without additional cost to Owner.
- B. Field Monitoring and Testing
 - 1. Full-time monitoring of pile driving operations will be provided by the Owner. No piles shall be driven except in the presence of an authorized representative of the Engineer.
 - 2. Certification of quality of pile materials to be used in the work shall be furnished, in a form acceptable to the Engineer, at the time of delivery of materials to the site. Pile materials shall also be subject to on-site observation for conformance with specifications.
 - 3. Approvals given by the Engineer or by testing agencies shall not relieve the Contractor of his responsibility for performing the work in accordance with the Contract Documents.

1.5 SUBMITTALS

A General

- 1. The Contractor shall submit the information specified herein to the Engineer for review. Unless otherwise specified, submittals shall be made not less than two weeks before the start of the work.

B. Shop Drawings

- 1. A tabular summary of anticipated pile lengths at each column location or other point of support.

- C. Description of pile driving and equipment. Include details of hammer, weight, and length of stroke of striking parts of hammer, description of leads, cushion material and helmet.

-
- D. With each delivery the contractor shall furnish certification of the pressure treatment for piles.
 - E. As-Driven Pile Location Data:
 - 1. Submit pile location two days after individual pile or pile cluster is completed.
 - 2. At the completion of pile driving, submit final as-driven pile location plan, certified by a Registered Land Surveyor or Registered Professional Engineer.

1.6 JOB CONDITIONS:

A. Site and Subsurface Conditions

- 1. Subsurface investigation data is available and is included with this project manual.

Prior to submitting their bid, the Contractor shall review and understand the information contained in the report. The geotechnical investigation report is made available to the Contractor for information on factual data only and shall not be interpreted as a warranty of subsurface conditions whether interpreted from written text, boring logs, or other data. Please note that since preparation of the report, some changes have been made to the layout of structures and the elevated wood deck.

- 2. Available soil samples recovered from borings may be examined at the office of the Engineer. The boring information is considered to represent the conditions at the locations of the test borings and at the time the test borings were made. Variations from the conditions disclosed by the borings should be anticipated by this Contractor in planning and estimating the work.
- 3. The Contractor shall protect adjacent property, public utilities and structures, and completed work, from damage associated with the pile driving operation. Damage due to pile driving shall be repaired by the Contractor at his own expense.
- 4. The wetlands area is an environmentally sensitive area. Equipment is forbidden from impacting the area. The boardwalk meanders through this area and care should be taking to minimize wetland disturbance.

1.7 PRODUCT DELIVERY STORAGE AND HANDLING:

- A. The Contractor shall deliver piles at times and in sequence to assure continuity of pile driving.
- B. Piles shall be handled, transported, stacked and protected to prevent damage.

1.8 LINES AND GRADES:

- A. The Contractor shall stake the pile locations and establish all elevations required. A baseline and benchmark located on or close to the site will be provided by the Owner. The Contractor shall be responsible for the maintenance and protection of the baseline and benchmark, and all pile location stakes.
- B. The Contractor shall employ a licensed Registered Land Surveyor or a Registered Civil Engineer, familiar with pile installation, who shall establish lines and levels. The Contractor shall be responsible for the correct location of piles, as well as keeping up-to-date records of the amount of uplift of individual piles, and establishing actual pile locations. Locations of the centers of as-driven piles shall be shown on a drawing in relation to the design location and submitted to the Engineer within two days after the individual pile or pile group is completed. Drawings shall include the following:
 - 1. Column lines and north arrow.
 - 2. Each pile identified by a separate number.
 - 3. Elevation of each top of pile prior to cutting, to nearest 0.1 foot.
 - 4. Deviation in inches, to the nearest one-fourth inch, from plan location at cutoff elevation.
- C. Within two weeks after the completion of all pile driving, the Contractor shall provide for the Engineer a plan, certified by said Surveyor or Engineer, showing the as-driven location of all piles.

PART 2 - PRODUCTS

2.1 TREATED TIMBER PILES:

- A. Treated timber piles shall be Southern Yellow Pine, Douglas Fir, or Oak. Each pile shall be in one piece cut from a sound live tree, and free from any defects that will impair its strength and durability. All piles shall be butt-cut above the ground swell, shall have substantially uniform taper form butt to tip end, and shall be free from short kinks. Knots or blemishes shall be trimmed off close to and even with

the body of the pile. The axis of the wood piles shall not deviate from the straight line more than six inches for the entire length. Except as otherwise provided herein, piles shall meet the requirements of ASTM D25.

- B. Since single piles are being installed and structural connections must be made to the piles, each pile must satisfy both of the following minimum size criteria:
tip diameter = 8 in. - butt diameter = 11 in.
- C. No inspection of wood piles shall be made by the Owner prior to delivery of piles to the site of the work. At the site, the piles will be inspected by the Owner's representative and any piles which do not comply with the specifications will be rejected and shall be removed from the site by the Contractor. Regardless of this inspection, any pile broken or damaged during driving will be rejected.
- D. Length of piles to be ordered shall be determined by the Contractor. Ordering and delivery of piles shall be planned in such a manner that changes in length of piles may be made if driving experience, as work progresses, indicates need for such changes.
- E. Piles shall be pressure treated with a Chromated Copper Arsenic (CCA) in accordance with the current edition of the following American Wood Preserver's Association specifications.
 - 1. C1 "Standard for Preservative Treatment by Pressure Process – All Timber Products."
 - 2. C3 "Standard for the Preservative Treatment of Piles by Pressure Process, Land and Fresh Water Piles."
- F. Retention of CCA shall be not less than 0.8 pounds per cubic foot of pile.
- G. Splicing of piles will not be permitted.

PART 3 - EXECUTION

3.1 SEQUENCE OF OPERATIONS AND EQUIPMENT REQUIREMENTS:

- A. The Contractor shall provide at least one fully equipped pile driving rig in full-time operation at the site during the work, and shall mobilize additional equipment, if necessary, to complete the work on schedule.
- B. The Contractor's attention is directed to the requirements of the test pile program. No production piles shall be driven until completion and evaluation of the test pile program.

- C. When piles are located in an area where excavation is to be made, the piles shall not be driven until the excavation has been completed.
- D. The Contractor shall coordinate his pile driving operations with other work on the project.

3.2 EQUIPMENT:

- A. Piles shall be installed with approved modern equipment. The proposed pile installation equipment and methods shall be subject to the approval of the Engineer and approval shall be secured before the start of installation.
- B. The leads of the pile driving rig shall be fixed at two points; the points shall be at least half the length of the leads apart in order to maintain the pile and hammer in axial alignment at the correct plan location during the entire driving operation. The leads shall extend down to the lowest point at which the hammer must operate.
- C. Piles may be driven with a single acting, double acting or differential acting steam or air hammer, or a diesel hammer delivering a minimum of 9,000 foot pounds and a maximum of 12,500 foot pounds of energy per blow. When the determination of the final driving resistance is being made, a steam or air hammer shall be operated at a speed not less than 95 percent of the maximum blows per minute for which the hammer is rated by the manufacturer. The Contractor shall maintain the boiler or air pressure recommended by the manufacturer and shall employ the proper size hose and connections. When the determination of final driving resistance is being made with a diesel hammer, the energy actually being delivered to the pile shall be determined as the product of the weight of the ram times the observed or equivalent stroke for open diesel hammers; for closed diesel hammers, the energy shall be that indicated by an output gauge calibrated to measure the total hammer energy.
- D. In the case of diesel hammers, the Contractor will be required to provide an apparatus, approved by the Engineer, to measure gas pressures inside the hammer for closed hammers or ram bounce height in the case of open hammers.
- E. Collars or bands of a design approved by the Owner shall be used where required for the protection of pile butts against splitting, brooming or other damage when the piles are driven.
- F. The use of followers will not be permitted unless authorized in writing by the Engineer.

- G. Hammers used to drive permanent piles shall be of the same type and have the same rated energy as the hammer used to drive test piles to confirm anticipated lengths.

3.3 INSTALLATION:

A. Test Piles

1. Prior to the start of production work, the Contractor shall drive ten (10) piles throughout the entire site in order to confirm anticipated pile lengths.
2. Test piles shall be installed by the specified methods and equipment specified for production piles.
3. Test piles installed at production locations shall be acceptable and included in the pay length for payment, if all other acceptance criteria are met.

B. Driving

1. As part of preparation for driving, each pile shall be marked (temporarily) at one-foot intervals along the entire pile length. In addition, the footage shall be marked and designated at five-foot intervals, starting from the tip of the pile. Since piles are part of the finish wood structure, any visible markings above ground surface placed on piles by the contractor shall be removed.
2. All piles shall be driven at the locations and orientations shown on the Drawings. Pile location and orientation shall be checked during driving and appropriate measures taken, as necessary, to maintain the correct pile position.
3. Each pile shall be driven to bearing in sand and gravel to a minimum capacity of 25 tons in compression. Pile driving shall be continuous from ground surface to final tip elevation without interruption. The average hammer blows per inch of penetration for the final six inches shall be a minimum of 6 blows per inch. If an abrupt increase in driving resistance is encountered, the driving shall be terminated when the pile penetration is less than ½ inch in ten successive blows.
4. Immediately after a pile is driven, the Contractor shall establish a reference point and its elevation on the pile for the purpose of checking uplift of the pile tip.

5. After all piles within the radius of uplift have been driven, the Contractor shall determine the elevation of the reference points on each of the piles. If uplift of 0.04 feet or more has occurred, the pile shall be redriven to its original elevation, and deeper if necessary, to the specified final driving resistance. After redriving each pile, the Contractor shall re-establish the elevation of the reference point. Re-driving shall be repeated as often as necessary until the measured uplift on any pile is less than 0.04 feet.
6. The radius of uplift is defined as the maximum distance between piles such that pile driving causes uplift of 0.04 feet or more in the affected pile. Survey instruments used to establish the reference elevations shall be carefully checked and adjusted as necessary to insure accurate readings. Uplift measurements shall be submitted to the Engineer.

C. Obstructions

1. The Contractor shall make reference to the test boring logs and available plans showing the site conditions. This Contractor is advised that obstructions, including piles, concrete foundations and building rubble, may be encountered buried within the fill materials.
2. Where obstructions interfere with installing piles at the locations shown and to the specified depth, the Contractor shall attempt to remove or clear the obstruction by excavation or spudding.
3. New piles abandoned because of obstructions encountered below El. 0 shall be cut off or pulled out at the discretion of the Engineer and the hole filled with sand. The Contractor will be paid on the basis of the length penetrated below the design cut-off elevation.
4. Predrilled holes abandoned because of obstructions shall be immediately backfilled with sand.

D. Cutting off Piles

1. Pile tops shall be cut off square, or as a beveled cut as shown on the drawings, within one inch of the elevations shown on the drawings. The pile cut-offs shall become the property of the Contractor and shall be removed from the site.
2. After being cut to grade, the top surface of the pile shall be brush treated with copper naphthenate in accordance with AWWA recommendations.
3. When piles are driven below the design cut-off grade, due to unexpected penetration, a limited number of build-ups will be permitted in accordance

with designs provided by the Contractor and approved by the Engineer. Build-up costs shall be the responsibility of the Contractor. Build ups are not acceptable at locations where piles extend above the deck.

3.4 TOLERANCES AND CRITERIA FOR ACCEPTANCE:

- A. Piles shall be driven as close as practicable to the plan location. A maximum lateral deviation from the correct location at cut-off elevation permitted will be three inches. A maximum deviation from design cut-off elevation equal to one inch will be permitted.
- B. The plumbness of a driven pile, as measured on the projection of the pile above ground, shall not deviate by greater than five percent from the design alignment, except piles that extend above the deck shall not exceed a plumbness of 2 percent from design alignment.
- C. Piles that are damaged below cut-off elevation during driving will be rejected. Upon comparing pile performance during driving with that of other driven piles, and based on his knowledge of subsurface conditions, the Engineer determines that a pile has been unacceptably damaged, he may reject the pile.
- D. Piles indicating sudden or peculiar decrease in penetration resistance during driving will be assumed to be broken and will be rejected unless Engineer's review of available data indicates that sudden decrease in driving resistance is due to natural, subsurface conditions and continued acceptable driving behavior is observed.
- E. Except as specified under "Obstructions", piles that are rejected because of damage, mislocation or misalignment, or failure to meet the driving criteria, shall be cut off below the limits of the structure and abandoned, and additional piles shall be driven as directed by the Engineer.
- F. When otherwise acceptable, installed piles exceed the specified tolerances, the Contractor shall provide an accurate survey to the Engineer, as specified. The Engineer will then analytically determine the total loads on individual piles, based on this survey. If the load capacity, corrections shall be made in accordance with a design provided by the Engineer.
- G. The installation of replacement piles and other corrective measures shall in all cases be in accordance with designs provided by the Engineer.
- H. Whenever, in the judgment of the Engineer, misalignment or rejection of a pile or piles caused by the Contractor's violation of the specifications or his other error, necessitates structural redesign, the cost of such redesign shall be deducted from

sums otherwise due to the Contractor under the contract. Whenever, in the judgment of the Engineer, misalignment or rejection of a pile or piles caused by the Contractor's violation of the specifications or his other error necessitates structural redesign of a pile cap, and the redesigned pile cap requires greater quantities of concrete and reinforcing steel, the quantities required shall be compared with the quantities required for the pile cap for the design pile group configuration, and the additional cost for pile cap concrete, reinforcing steel and form work shall be deducted from the contract price, in addition to redesign cost.

PART 4 – MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

- A. Piles will be measured for payment on the basis of length along the axis of the pile in place below the design cut-off design elevation.

4.2 BASIS OF PAYMENT

- A. Work included under this contract shall include the total price for installation of the linear feet of bearing piles. The amount of such work shall include furnishing and driving the piles, and all work incidental there to, and mobilization and demobilization which shall include jobs set-up, moving equipment including pile driving rigs on and off the project, establishing and dismantling the Contractor's field administration forces and equipment, and all other work incidental thereto.
- B. Treated timber installation shall include the total price for the installation of the following pile quantities:
 - 1. Base Bid: Installation of 8,645 lin. ft. for 247 design piles.
- C. Final payment shall be based upon the actual total aggregate footage of piles driven and accepted in accordance with this section. If the total aggregate footage is over or under the base quantity, the additional footage shall be paid to the Contractor or the deducted footage shall be credited to the Owner on the basis of the unit prices indicated in Specification Section 01 02 00.
- D. The total aggregate footage piles for payment shall be the sum of the lengths of piles below design cut-off grade actually driven, and accepted, whether or not the number of piles is more, equal to, or less than is shown on the Contract Drawings. For beveled cut offs, payment shall be measured from the top of the bevel, as shown on the drawings.

- E. Piles rejected in accordance with the provisions of these specifications and which result, in the judgment of the Engineer, from the Contractor's violation of the Specifications or his other error will not be paid for. In such cases, the Contractor will be paid at the contract unit price per foot for one replacement pile installed and accepted, according to the provisions of these specifications. If more than one replacement pile is required to compensate for a rejected pile, the Contractor will be paid at the contract unit price per foot only the longer of the replacement piles. Additional piles required to compensate for production piles or replacement piles driven out of design location will be installed at no additional cost to the Owner.

- F. Piles rejected, in the judgment of the Engineer, due to causes other than the Contractor's violation of the Specifications or have other error, will be measured and included in the aggregate footage of piles for payment.

- G. No payment will be made for pile cut-offs or pile buildups.

- H. For payment due to obstructions, see paragraph 3.3 C entitled "Obstructions".

END OF SECTION 02 45 90

SECTION 04 20 00 - UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
1. Concrete Masonry Unit Assemblies including fire rated wall and non fire rated wall as shown on drawings.
 2. Exterior split faced masonry units.
 3. Grouting: Grouting of hollow metal work and reinforcing steel.
 4. Anchorage, reinforcement.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

- A. Provide unit masonry that develops the following installed compressive strengths (fm):
1. For concrete unit masonry: fm = 1500 psi.
 2. For clay unit masonry: fm = 2500 psi.

1.4 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Submit manufacturer's printed literature indicating product information correlated to specified requirements. Submit manufacturer's specifications, with certified copies of laboratory test reports and other data as may be required to show compliance with the Contract Documents for each type of masonry unit specified herein.
- C. Samples for verification:
1. Full-size units for each different exposed masonry unit required showing full range of exposed color, texture, and dimensions to be expected in completed construction.
 - a. Include size variation data verifying that actual range of sizes for brick falls within ASTM C 216 dimension tolerances for brick where modular dimensioning is indicated.
 2. Colored masonry mortar samples for matching color required showing the full range of colors expected in the finished construction. Label samples to indicate type and amount of colorant used.
- D. Material certificates for the following signed by manufacturer and Contractor certifying that each material complies with requirements.

1. Each different cement product required for mortar and grout including manufacturer, brand, type, and weight slips at time of delivery.
 2. Each material and grade indicated for reinforcing bars.
 3. Each type and size of joint reinforcement.
 4. Each type and size of anchors, ties, and metal accessories.
- E. Provide cold and hot weather construction procedures complying with requirements in referenced unit masonry standard.
- F. Provide Schedule of Reinforcements and all other materials, components, accessories and products used as selected from these specifications. Provide illustrated catalog cuts with relevant data and product information

1.5 QUALITY ASSURANCE

- A. Except as modified by governing codes and by the Contract Documents, comply with the applicable provisions and recommendations of the following:
1. NCMA No.59 "Reinforced Concrete Masonry Construction".
 2. PCA "Concrete Masonry Handbook".
 3. ACI "American Concrete Institute" Handbook.
 4. Where the language in any document referred to herein is in the form of a recommendation or suggestion, such recommendations or suggestions shall be deemed to be mandatory under this Contract.
- B. Fire Performance Characteristics: Where indicated, provide materials and construction identical to those of assemblies whose fire resistance has been determined per ASTM E 119 by a testing and inspecting organization, by equivalent concrete masonry thickness, or by another means, as acceptable to authorities having jurisdiction.
1. Provide fire-resistance-rated assemblies identical to those indicated by reference to design designations in U.L. "Fire Resistance Directory" or in listing of other testing agencies acceptable to authorities having jurisdiction.
- C. Single-Source Responsibility for Masonry Units: Obtain exposed masonry units of uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one manufacturer for each different product required for each continuous surface or visually related surfaces.
- D. Single-Source Responsibility for Mortar Materials: Obtain mortar ingredients of uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source and producer for each aggregate.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver masonry materials to project in undamaged condition.

- B. Store and handle masonry units off the ground, under cover, and in a dry location to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, and other causes. If units become wet, do not place until units are in an air-dried condition.
- C. Store cementitious materials off the ground, under cover, and in dry location.
- D. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- E. Store masonry accessories including metal items to prevent corrosion and accumulation of dirt and oil.

1.7 PROJECT CONDITIONS

- F. Protection of Masonry: During erection, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
 - 2. Where one wythe of multi-wythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.
- G. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.
- H. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Remove immediately any grout, mortar, and soil that comes in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes from mortar droppings.
- I. Cold-Weather Construction: Comply with referenced unit masonry standard for cold-weather construction and the following:
 - 1. Do not lay masonry units that are wet or frozen.
 - 2. Remove masonry damaged by freezing conditions.
- J. Hot-Weather Construction: Comply with referenced unit masonry standard.

PART 2 - PRODUCTS

2.1 MATERIALS GENERAL

- A. Comply with referenced unit masonry standard and other requirements specified in this section applicable to each material indicated.

2.2 CONCRETE MASONRY UNITS

- A. General: Comply with requirements indicated below applicable to each form of concrete masonry unit required.
1. Provide special shapes where indicated and as follows:
 - a. For lintels, corners, jambs, sash, control joints, headers, bonding, and other special conditions.
 - b. Bullnose units for outside corners unless otherwise indicated.
 2. Size: Provide concrete masonry units complying with requirements indicated below for size that are manufactured to specified face dimensions within tolerances specified in the applicable referenced ASTM specification for concrete masonry units.
 - a. Concrete Masonry Units: Manufactured to specified dimensions of 3/8 inch less than nominal widths by nominal heights by nominal lengths indicated on drawings.
 - b. Nominal 2", 4", 6", 8", 10" and 12" wide x 8" high x 16" long unless otherwise noted.
 3. Provide Type I, moisture control units.
- B. Hollow Load-Bearing Concrete Masonry Units: ASTM C 90, Grade N and as follows:
1. Unit Compressive Strength: Provide units with minimum average net area compressive strength indicated below:
 - a. 1900 psi.
 2. Weight Classification: Normal weight.
- C. Solid Load-Bearing Concrete Masonry Units: ASTM 145, Grade N, for fire rated partitions when hollow load-bearing units specified above do not meet requirements for hourly ratings in thickness indicated on the drawings.
- D. Concrete Masonry Unit Lintels (Bond Beam Units): ASTM 145, Grade N, and as follows:
1. "U" shaped concrete masonry units of matching texture and appearance to adjacent units, reinforced with steel reinforcing bars (min. (2) #5 U.O.N.) and fill with 3000 psi concrete conforming to requirements specified under the "Concrete Work" section of the specifications. Lintels shall be 16 inches longer than the opening. Lintels shall not be used over openings where span of opening exceeds design limitations of steel rod reinforcing. Temporarily support formed in place lintels.
- E. Integral Water Repellent: Provide units made with integral water repellent for all exterior units exposed to the weather.
1. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested according to ASTM E 514/E 514M as a wall assembly made with mortar containing

integral water-repellent manufacturer's mortar additive, with test period extended to 24 hours, shall show no visible water or leaks on the back of test specimen.

- F. Decorative CMUs: ASTM C 90.
 - 1. Density Classification: Normal weight.
 - 2. Size (Width): Manufactured to dimensions 3/8 inch (10 mm) less than nominal dimensions.
 - 3. Pattern and Texture:
 - a. Standard pattern, split-face finish.
 - 4. Colors: As selected by Architect from manufacturer's full range.
- G. Concrete Masonry Unit Types: location as indicated on drawings.
 - 1. Hollow, lightweight concrete for firewalls.
 - 2. Hollow load and non-load bearing CMU, smooth face.
 - 3. Solid non-load bearing exterior split faced CMU.

2.3 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce required mortar color.
- B. Masonry Cement: Not Allowed.
- C. Ready-Mixed Mortar: Cementitious materials, water, and aggregate complying with requirements specified in this article, combined with set-controlling admixtures to produce a ready-mixed mortar complying with ASTM C 1142.
- D. Hydrated Lime: ASTM C 207, Type S.
- E. Aggregate for Mortar: ASTM C 144, except for joints less than 1/4-inch use aggregate graded with 100 percent passing the No. 16 sieve.
 - 1. White Mortar Aggregates: Natural white sand or ground white stone.
- F. Aggregate for Grout: ASTM C 404.
- G. Colored Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with record of satisfactory performance in masonry mortars.
- H. Water: Clean and potable.
- I. Products: Subject to compliance with requirements, provide one of the following:

1. Colored Mortar Pigments:
 - a. "Centurion Pigments," Centurion.
 - b. "True Tone Mortar Colors," Davis Colors, A Subsidiary of Rockwood Industries, Inc.
 - c. "SGS Mortar Colors," Solomon Grind-Chem Services, Inc.

2.4 REINFORCING STEEL

- A. General: Provide reinforcing steel complying with requirements of referenced unit masonry standard and this article. Hot dipped galvanized in accordance with ASTM A123.
- B. Steel Reinforcing Bars: Material and grade as follows:
 1. Provide No. 4 deformed bars, ASTM A615, Grade 60, minimum lap 1 foot 4 inches.
- C. Deformed Reinforcing Wire: ASTM A 496.
- D. Plain Welded Wire Fabric: ASTM A 185.
- E. Deformed Welded Wire Fabric: ASTM A 497.

2.5 JOINT REINFORCEMENT

- A. General: Provide joint reinforcement complying with requirements of referenced unit masonry standard and this article, formed from the following:
 1. Galvanized carbon steel wire, coating class as required by referenced unit masonry standard for application indicated.
- B. Description: Welded-wire units prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10 feet, with prefabricated corner and tee units, and complying with requirements indicated below:
 1. Wire Diameter for Side Rods: 0.1483 inch (9 gage).
 2. Wire Diameter for Cross Rods: 0.1483 inch (9 gage).
 3. For single-wythe masonry provide type as follows with single pair of side rods:
 - a. Truss design with continuous diagonal cross rods spaced not more than 8 inches o.c. vertically
 4. For multi-wythe masonry provide type as follows:
 - a. Ladder design with perpendicular cross spaced not more than 8 inches o.c. vertically and number of side rods as follows:
 - 1) Number of Side Rods for Multi-wythe Concrete Masonry: One side rod for each face shell of hollow masonry units more than 4 inches in nominal width plus one side rod for each wythe of masonry 4 inches or less in nominal width.
- C. Manufacturers: Subject to compliance with requirements, provide joint reinforcement by one of the following:
 1. Dur-O-Wal, Inc.

2. Heckman Building Products, Inc.
3. Hohmann & Barnard, Inc.
4. National Wire Products Industries.

2.6 TIES AND ANCHORS, GENERAL

- A. General: Provide ties and anchors specified in subsequent articles that comply with requirements for metal and size of referenced unit masonry standard and of this article. Steel, hot-dipped heavily galvanized steel in accordance with ASTM A153, Class B2.
- B. Galvanized Carbon Steel Wire: ASTM A 82, coating class as required by referenced unit masonry standard for application indicated.
- C. Galvanized Carbon Steel Wire: ASTM A 82, coating class as required by referenced unit masonry standard, for wire ties and anchors in interior walls, unless otherwise indicated.
- D. Steel Plates and Bars: ASTM A 36, hot-dip galvanized to comply with ASTM A 123 or ASTM A 153, Class B3, as applicable to size and form indicated.

2.7 BENT WIRE TIES

- A. Individual units prefabricated from bent wire to comply with requirements indicated below:
- B. Tie Shape for Hollow Masonry Units Laid with Cells Vertical: Rectangular with closed ends and not less than 4 inches wide.
- C. Type for Masonry Where Coursing Between Wythes Align: Unit ties bent from one piece of wire.
- D. Tie Shape for Solid Masonry Unit Construction: Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches long.
- E. Type for Masonry Where Coursing Between Wythes Align: Unit ties bent from one piece of wire.
- F. Type for Masonry Where Coursing Between Wythes Does Not Align: Adjustable ties composed of two parts, one with pintles, the other with eyes, maximum misalignment 1-1/4 inches.

2.8 ANCHORS

- A. Rigid Anchors: Provide straps of form and length indicated, fabricated from metal strips of following width and thickness.
 1. 1-1/2 inches wide by 1/4-inch-thick by minimum 12" long.
 2. For anchoring load bearing wall at intersections.
- B. Structural Steel Anchors:

1. Provide masonry anchors on all columns and beams running perpendicular to or parallel to masonry walls.
2. Provide parallel and perpendicular column flange and beam web anchors to suit job condition. Provide flexible type anchor where expansion or control joints are located.
3. Provide web or flange anchors type to suit job condition.

2.9 ADJUSTABLE ANCHORS FOR CONNECTING MASONRY TO STRUCTURAL FRAMEWORK

- A. General: Two-piece assemblies as described below allowing vertical or horizontal differential movement between wall and framework parallel to plane of wall, but resisting tension and compression forces and perpendicular to it.
- B. For anchorage to concrete or existing masonry wall, provide manufacturer's standard with 12 ga. anchor channel anchor section formed from sheet metal and triangular-shaped wire tie section sized to extend within 1 inch of masonry face.
- C. For anchorage to steel framework provide manufacturer's standard anchors with crimped 3/4" wide 12 ga. anchor strap section for welding to steel and triangular-shaped wire tie section sized to extend within 1 inch of masonry face.
- D. Joint Reinforcement Veneer Units consisting of adjustable eye-wire integral with joint reinforcement. Hohman & Barnard LOX-ALL Adjustable Eye Wire. 1/4" dia. rectangular wire, length as required to extend 1-1/2" into masonry wythe of veneer face.

2.10 EMBEDDED FLASHING MATERIALS

- A. Rubberized Asphalt Sheet Flashing: Manufacturer's standard composite flashing product consisting of 32-mil-thick pliable and highly adhesive rubberized asphalt compound bonded completely and integrally to 8-mil-thick, high-density, cross-laminated polyethylene film to produce an overall thickness of 40 mils.
- B. Adhesive for Flashings: Of type recommended by manufacturer of flashing material for use indicated.
- C. Products: Subject to compliance with requirements, provide one of the following:
 1. Rubberized Asphalt Sheet Flashing:
 - a. "Perm-A-Barrier Wall Flashing," W.R. Grace & Co.

2.11 MISCELLANEOUS MASONRY ACCESSORIES

- A. Nonmetallic Expansion Joint Strips: Premolded filler strips complying with ASTM D 1056, Type 2 (closed cell), Class A (cellular rubber and rubber-like materials with specific resistance to petroleum base oils), Grade 1 (compression-deflection range of 2-5 psi), compressible up to 35 percent, of width and thickness indicated, formulated from the following material:

1. Neoprene.
 2. Urethane.
 3. Polyvinyl chloride.
- B. Preformed Control Joint Gaskets: Material as indicated below, designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
1. Styrene-Butadiene Rubber Compound: ASTM D 2000, Designation 2AA-805.
 2. Polyvinyl Chloride: ASTM D 2287, General Purpose Grade, Type PVC-65406.
- C. Bond Breaker Strips: Asphalt-saturated organic roofing felt complying with AJTM D226, Type I (No. 30 asphalt felt).

2.12 MASONRY CLEANERS

- A. Job-Mixed Detergent Solution: Solution of trisodium phosphate (1/2-cup dry measure) and laundry detergent (1/2-cup dry measure) dissolved in one gallon of water.

2.13 MORTAR AND GROUT MIXES

- A. General: Do not add admixtures including coloring pigments, air-entraining agents, accelerators, retarders, water repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
1. Do not use calcium chloride in mortar or grout.
- B. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification for job-mixed mortar and ASTM C 1142 for ready-mixed mortar, of types indicated below:
1. Limit cementitious materials in mortar to portland cement-lime.
 2. For masonry below grade and in contact with earth, and where indicated, use type indicated below:
 - a. Type S.
 3. For reinforced masonry and where indicated, use type indicated below:
 - a. Type S.
 4. For exterior, above-grade load bearing and non-load bearing walls and parapet walls; for interior load bearing walls; for interior non-load bearing partitions, and for other applications where another type is not indicated, use type indicated below:
 - a. Type S.
- C. Colored Pigmented Mortar: Select and proportion pigments with other ingredients to produce color required.
1. Mix to match Owner's Representative's sample.
- D. Grout for Unit Masonry: Comply with ASTM C 476 and referenced unit masonry standard.

2.14 SOURCE QUALITY CONTROL

- A. Concrete Masonry Unit Tests: For each type, class, and grade of concrete masonry unit indicated, units will be tested by qualified independent testing laboratory for strength, absorption, and moisture content per ASTM C 140.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other specific conditions, and other conditions affecting performance of unit masonry.
 - I. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of unit masonry.
- B. Examine rough-in and built-in construction to verify actual locations of piping connections prior to installation.
- C. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Comply with referenced unit masonry standard and other requirements indicated applicable to each type of installation included in Project.
- B. Thickness: Build cavity and composite walls and other masonry construction to the full thickness shown. Build single-wythe walls to the actual thickness of the masonry units, using units of nominal thickness indicated.
- C. Build chases and recesses as shown or required to accommodate items specified in this and other Sections of the Specifications. Provide not less than 8 inches of masonry between chase or recess and jamb of openings and between adjacent chases and recesses.
- D. Leave openings for equipment to be installed before completion of masonry. After installation of equipment, complete masonry to match construction immediately adjacent to the opening.
- E. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining construction. Use full-size units without cutting where possible.

3.3 CONSTRUCTION TOLERANCES

- A. Comply with construction tolerances of referenced unit masonry standard.

3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint widths and for accurate locating of openings, movement-type joints, returns, and offsets. Avoid the use of less-than-half-size units at corners, jambs, and where possible at other locations.
- B. Lay up walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other construction.
- C. Bond Pattern for Exposed Masonry: Lay exposed masonry in the following bond pattern; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
 - 1. One-half running bond with vertical joint in each course centered on units in courses above and below.
- D. Stopping and Resuming Work: In each course, rack back 1/2-unit length for one-half running bond or 1/3-unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly (if required), and remove loose masonry units and mortar prior to laying fresh masonry.
- E. Built-In Work: As construction progresses, build-in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.
 - 1. Fill space between hollow metal frames and masonry solidly with mortar, unless otherwise indicated.
 - a. At exterior frames insert extruded polystyrene board insulation around perimeter of frame in thickness indicated but not less than 3/4 inch to act as a thermal break between frame and masonry.
 - 2. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.
 - 3. Fill cores in hollow concrete masonry units with grout 3 courses (24 inches) under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow concrete masonry units as follows:
 - 1. With full mortar coverage on horizontal and vertical face shells.
 - 2. Bed webs in mortar in starting course on footings and in all courses of piers, columns, and pilasters, and where adjacent to cells or cavities to be filled with grout.
 - 3. For starting course on footings where cells are not grouted, spread out full mortar bed including areas under cells.
- B. Cut joints flush for masonry walls to be concealed or to be covered by other materials, unless otherwise indicated.

3.6 STRUCTURAL BONDING OF MULTI-WYTHE MASONRY

- A. Use individual metal ties installed in horizontal joints to bond wythes together.

- B. Use continuous horizontal joint reinforcement installed in horizontal mortar joints for bond tie between wythes.
- C. Corners: Provide interlocking masonry unit bond in each course at corners, unless otherwise shown.
 - 1. Provide continuity with horizontal joint reinforcement at corners using prefabricated "L" units, in addition to masonry bonding.
- D. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, provide same type of bonding specified for structural bonding between wythes and space as follows:
 - 1. Provide individual metal ties.
 - 2. Provide continuity with horizontal joint reinforcement using prefabricated "T" units.
- E. Nonbearing Interior Partitions: Build full height of story to underside of solid floor or roof structure above and as follows:
 - 1. Install pressure-relieving joint filler in joint between top of partition and underside of structure above.
 - 2. Anchor wall to underside of roof/floor deck at 32" o.c.

3.7 CAVITIES/AIR SPACES

- A. Keep cavities/air spaces clean of mortar droppings and other materials during construction. Strike joints facing cavities/air spaces flush.
- B. Tie exterior wythe to backup with individual metal ties. Stagger alternate courses.
- C. Tie exterior wythe to back-up with continuous horizontal joint reinforcing.

3.8 HORIZONTAL JOINT REINFORCEMENT

- A. General: Provide continuous horizontal joint reinforcement as indicated. Install longitudinal side rods in mortar for their entire length with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcing a minimum of 6 inches.
- B. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- C. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend reinforcement units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.9 ANCHORING MASONRY TO STRUCTURAL MEMBERS

- A. Anchor concrete masonry to structural members where masonry abuts or faces structural members to comply with the following:

1. Provide an open space not less than 1 inch in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar or other rigid materials.
2. Anchor masonry to structural members with flexible anchors embedded in masonry joints and attached to structure.
3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 32 inches o.c. horizontally.

3.10 MOVEMENT (CONTROL AND EXPANSION) JOINTS

- A. General: Install control and expansion joints in unit masonry where indicated. Note: If control joints are not indicated, Contractor shall provide joints at each column and at a maximum of 30' - 0". Build in related items as the masonry progresses. Do not form a continuous span through movement joints unless provisions are made to prevent in-plane restraint of wall or partition movement.
- B. Form control joints in concrete masonry as follows:
 1. Fit bond breaker strips into hollow contour in ends of block units on one side of control joint. Fill the resultant core with grout and rake joints in exposed faces.
 2. Install preformed control joint gaskets designed to fit standard sash block.
 3. Install special shapes designed for control joints. Install bond breaker strips at joint. Keep head joints free and clear of mortar or rake joint.
- C. Build in horizontal pressure-relieving joints where indicated; construct joints by either leaving an air space or inserting nonmetallic 50 percent compressible joint filler of width required to permit installation of sealant and backer rod specified in Division 7 Section "Joint Sealers."

3.11 LINTELS

- A. General: Provide lintels at all masonry openings (see work of other trades) whether shown on plans or not. Lintels required for wherever openings are wider than 1'-0.
- B. Provide masonry lintels where shown and wherever openings of more than 2 feet for block size units are shown without structural steel or other supporting lintels. Temporarily support formed-in-place lintels.
- C. Steel Lintels: Provide at exterior openings, and interior openings and where indicated. Paint lintels where exposed to view. See Section 05500 Metal Fabrications.
- D. Provide minimum bearing of 8 inches at each jamb, unless otherwise indicated. Temporarily support formed in place lintels.
- E. All lintel in fire rated walls shall be of reinforced concrete. Steel angles are not acceptable in fire rated walls.

3.12 FLASHING

-
- A. General: Install embedded flashing in masonry at shelf angles, lintels, ledges, other obstructions to the downward flow of water in the wall, and where indicated.
 - B. Prepare masonry surfaces so that they are smooth and free from projections that could puncture flashing. Place through-wall flashing on sloping bed of mortar and cover with mortar. Seal penetrations in flashing with adhesive/sealant/tape as recommended by flashing manufacturer before covering with mortar.
 - C. Install flashings as follows:
 - 1. At lintels and shelf angles, extend flashing a minimum of 4 inches into masonry at each end. Extend flashing from exterior face of outer wythe of masonry, through the outer wythe, turned up a minimum of 4 inches, and through the inner wythe to within 1/2 inches of the interior face of the wall in exposed masonry. Where interior surface of inner wythe is concealed by furring, carry flashing completely through the inner wythe and turn up approximately 2 inches, unless otherwise indicated.
 - 2. At heads and sills, extend flashing as specified above unless otherwise indicated but turn up ends not less than 2 inches to form a pan.
 - 3. Interlock end joints of ribbed sheet metal flashings by overlapping ribs not less than 1-1/2 inches or as recommended by flashing manufacturer and seal lap with electromeric sealant complying with requirements of Division 7 Section "Joint Sealers" for application indicated.
 - 4. Turn down sheet metal flashings at exterior face of masonry to form drip.
 - 5. Cut off flashing flush with face of wall after masonry wall construction is completed.

3.13 INSTALLATION OF REINFORCED UNIT MASONRY

- A. General: Install reinforced unit masonry to comply with requirements of referenced unit masonry standard.
- B. Temporary Formwork: Construct formwork and shores to support reinforced masonry elements during construction.
 - 1. Construct formwork to conform to shape, line, and dimensions shown. Make sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
- C. Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.
- D. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.

3.14 FIRE RATING AND SOUND REDUCTION

- A. At fire rated partitions, extend wall to underside of slab and fit around obstructions. Fire stop all

gaps, linear joints and penetrations comply with F.M. and U.L. Directory for fire rating and fire stop systems.

- B. Comply with Sound Control provisions referenced standard indicated. Seal where partition abuts a dissimilar surface with acoustical sealant. Seal around electrical box, cut outs and other penetrations with acoustical compound sealant to prevent sound transmission.

3.15 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or if units do not match adjoining units. Install new units to match adjoining units and in fresh mortar or grout, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point-up all joints including corners, openings, and adjacent construction to provide a neat, uniform appearance, prepared for application of sealants.
- C. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - 2. Test cleaning methods on sample wall panel; leave 1/2 panel uncleaned for comparison purposes. Obtain Owner's Representative's approval of sample cleaning before proceeding with cleaning of masonry.
 - 3. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
 - 4. Wet wall surfaces with water prior to application of cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
 - 5. Clean concrete masonry by means of cleaning method indicated in NCMA TEK 45 applicable to type of stain present on exposed surfaces.
- D. Protection: Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure unit masonry is without damage and deterioration at time of Substantial Completion.

END OF SECTION 04 20 00

SECTION 07 71 00 - ROOF SPECIALTIES

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:
 - 1. Roof-edge drainage systems.
- B. Related Requirements:
 - 1. Section 061000 "Rough Carpentry" for wood nailers, curbs, and blocking.
 - 2. Section 073113 "Asphalt Shingles"
 - 3. Section 079200 "Joint Sealants" for field-applied sealants between roof specialties and adjacent materials.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For roof specialties.
 - 1. Include plans, elevations, expansion-joint locations, keyed details, and attachments to other work. Distinguish between plant- and field-assembled work.
 - 2. Indicate profile and pattern of seams and layout of fasteners, cleats, clips, and other attachments.
 - 3. Detail termination points and assemblies, including fixed points.
 - 4. Include details of special conditions.
- C. Samples: For each type of roof specialty and for each color and texture specified.
- D. Samples for Initial Selection: For each type of roof specialty indicated with factory-applied color finishes.
- E. Samples for Verification:

1. Include Samples of each type of roof specialty to verify finish and color selection, in manufacturer's standard sizes.
2. Include roof-edge specialties and roof-edge drainage systems made from 12-inch (300-mm) lengths of full-size components in specified material, and including fasteners, cover joints, accessories, and attachments.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.
- B. Product Certificates: For each type of roof specialty.
- C. Sample Warranty: For manufacturer's special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roofing specialties to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer offering products meeting requirements that are FM Approvals listed for specified class and SPRI ES-1 tested to specified design pressure.
- B. Source Limitations: Obtain roof specialties approved by manufacturer providing roofing-system warranty specified in Section.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not store roof specialties in contact with other materials that might cause staining, denting, or other surface damage. Store roof specialties away from uncured concrete and masonry.
- B. Protect strippable protective covering on roof specialties from exposure to sunlight and high humidity, except to extent necessary for the period of roof-specialty installation.

1.8 FIELD CONDITIONS

- A. Field Measurements: Verify profiles and tolerances of roof-specialty substrates by field measurements before fabrication, and indicate measurements on Shop Drawings.

Coordination: Coordinate roof specialties with flashing, trim, and construction of parapets, roof deck, roof and wall panels, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.9 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof specialties shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
- B. SPRI Wind Design Standard: Manufacture and install roof-edge specialties tested according to SPRI ES-1 and capable of resisting the following design pressures:
 - 1. Design Pressure: As indicated on Drawings.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 EXPOSED METALS

- A. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.
 - 1. Surface: Smooth, flat finish.
 - 2. Exposed Coil-Coated Finishes: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Two-Coat Fluoropolymer: AAMA 620. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.

3. Color Anodic Finish, Coil Coated: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
- B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy and temper recommended by manufacturer for type of use and finish indicated, finished as follows:
1. Exposed High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Two-Coat Fluoropolymer: AAMA 2605. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.
 2. Color Anodic Finish, Coil Coated: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
 3. Surface: Smooth, flat finish.

2.3 CONCEALED METALS

- A. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy and temper recommended by manufacturer for type of use and structural performance indicated, mill finished.
- B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy and temper recommended by manufacturer for type of use and structural performance indicated, mill finished.
- C. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304.
- D. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation.

2.4 ROOF-EDGE DRAINAGE SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Architectural Products Company.
 2. ATAS International, Inc.
 3. Berger Building Products, Inc.
 4. Castle Metal Products.
 5. Cheney Flashing Company.
 6. CopperCraft by FABRAL.
 7. Hickman Company, W. P.
 8. Merchant & Evans Inc.
 9. Metal-Era, Inc.
 10. Metal-Fab Manufacturing, LLC.
 11. Perimeter Systems; a division of SAF.
- B. Gutters: Manufactured in uniform section lengths not exceeding 12 feet (3.6 m), with matching corner units, ends, outlet tubes, and other accessories. Elevate back edge at least 1 inch (25 mm)

above front edge. Furnish flat-stock gutter straps, gutter brackets, expansion joints, and expansion-joint covers fabricated from same metal as gutters.

1. Aluminum Sheet: 0.032 inch (0.82 mm) thick.
 2. Gutter Profile: 7" K – Style unless indicated otherwise.
 3. Corners: Factory mitered and mechanically clinched and sealed watertight.
 4. Gutter Supports: Manufacturer's standard supports as selected by Architect with finish matching the gutters.
 5. Gutter Accessories: Continuous screened leaf guard with sheet metal frame, Bronze wire ball downspout strainer, Wire ball downspout strainer, Flat ends, Bullnose ends for half-round gutter.
- C. Downspouts: Corrugated 4"x5" rectangular complete with elbows, manufactured from the following exposed metal. Furnish with metal hangers, from same material as downspouts, and anchors.
1. Formed Aluminum: 0.032 inch (0.82 mm) thick.
- D. Splash Pans: Fabricate from the following exposed material:
1. Pre-cast concrete.
- E. Aluminum Finish: Two-coat fluoropolymer color selected by the Architect from manufacturers standard colors.

2.5 MATERIALS

- A. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.
- B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy and temper recommended by manufacturer for type of use and finish indicated, finished as follows:

2.6 MISCELLANEOUS MATERIALS

- A. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:
1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.
 2. Fasteners for Aluminum: Aluminum or Series 300 stainless steel.
- B. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant of type, grade, class, and use classifications required by roofing-specialty manufacturer for each application.
- C. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type joints with limited movement.

2.7 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Examine walls, roof edges, and parapets for suitable conditions for roof specialties.
- C. Verify that substrate is sound, dry, smooth, clean, sloped for drainage where applicable, and securely anchored.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. General: Install roof specialties according to manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, underlayments, sealants, and other miscellaneous items as required to complete roof-specialty systems.
 - 1. Install roof specialties true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
 - 2. Provide uniform, neat seams with minimum exposure of solder and sealant.
 - 3. Install roof specialties to fit substrates and to result in weathertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
 - 4. Torch cutting of roof specialties is not permitted.
 - 5. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

1. Coat concealed side of uncoated aluminum and stainless-steel roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
 2. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof specialties for waterproof performance.
- C. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.
1. Space movement joints at a maximum of 12 feet (3.6 m) with no joints within 18 inches (450 mm) of corners or intersections unless otherwise indicated on Drawings.
 2. When ambient temperature at time of installation is between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.
- D. Fastener Sizes: Use fasteners of sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Seal concealed joints with butyl sealant as required by roofing-specialty manufacturer.
- F. Seal joints as required for weathertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F (4 deg C).

3.3 ROOF-EDGE DRAINAGE-SYSTEM INSTALLATION

- A. General: Install components to produce a complete roof-edge drainage system according to manufacturer's written instructions. Coordinate installation of roof perimeter flashing with installation of roof-edge drainage system.
- B. Gutters: Join and seal gutter lengths. Allow for thermal expansion. Attach gutters to firmly anchored gutter supports spaced not more than 12 inches (305 mm) apart. Attach ends with rivets and seal with sealant to make watertight. Slope to downspouts.
1. Install gutter with expansion joints at locations indicated but not exceeding 50 feet (15.2 m) apart. Install expansion-joint caps.
 2. Install continuous leaf guards on gutters with noncorrosive fasteners, removable for cleaning gutters.
- C. Downspouts: Join sections with manufacturer's standard telescoping joints. Provide hangers with fasteners designed to hold downspouts securely to walls and 1 inch (25 mm) away from walls; locate fasteners at top and bottom and at approximately 60 inches (1500 mm) o.c.
1. Provide elbows at base of downspouts at grade to direct water away from building.
 2. Connect downspouts to underground drainage system indicated.
- D. Splash Pans: Install where downspouts discharge on low-slope roofs. Set in elastomeric sealant.

3.4 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. Remove temporary protective coverings and strippable films as roof specialties are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain roof specialties in a clean condition during construction.
- D. Replace roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077100

SECTION 22 11 13 - FACILITY WATER DISTRIBUTION PIPING

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 includes water-distribution piping and related components outside the building for combined water service and fire-service mains.
- B. Utility-furnished products include water meters that will be furnished to the site, ready for installation.

1.3 DEFINITIONS

- A. EPDM: Ethylene propylene diene terpolymer rubber.
- B. LLDPE: Linear, low-density polyethylene plastic.
- C. PA: Polyamide (nylon) plastic.
- D. PE: Polyethylene plastic.
- E. PP: Polypropylene plastic.
- F. PVC: Polyvinyl chloride plastic.
- G. RTRF: Reinforced thermosetting resin (fiberglass) fittings.
- H. RTRP: Reinforced thermosetting resin (fiberglass) pipe.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components.
 - 1. Wiring Diagrams: Power, signal, and control wiring for alarms.

- C. Coordination Drawings: For piping and specialties including relation to other services in same area, drawn to scale. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.
- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.
 - 2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
 - 3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.
- B. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. Comply with ASTM F 645 for selection, design, and installation of thermoplastic water piping.
- E. Comply with FMG's "Approval Guide" or UL's "Fire Protection Equipment Directory" for fire-service-main products.
- F. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-service-main piping for fire suppression.
- G. NSF Compliance:
 - 1. Comply with NSF 14 for plastic potable-water-service piping. Include marking "NSF-pw" on piping.
 - 2. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:
 - 1. Ensure that valves are dry and internally protected against rust and corrosion.
 - 2. Protect valves against damage to threaded ends and flange faces.
 - 3. Set valves in best position for handling. Set valves closed to prevent rattling.

- B. During Storage: Use precautions for valves, including fire hydrants, according to the following:
 - 1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
 - 2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.
- C. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.
- D. Deliver piping 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.
- E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.
- F. Protect flanges, fittings, and specialties from moisture and dirt.
- G. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.7 COORDINATION

- A. Coordinate connection to water main with utility company.

PART 2 - PRODUCTS

2.1 COPPER TUBE AND FITTINGS

- A. Soft Copper Tube: ASTM B 88, Type L (ASTM B 88M, Type B), water tube, annealed temper.
 - 1. Copper, Solder-Joint Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.
 - 2. Copper, Pressure-Seal Fittings:
 - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Viega; Plumbing & Heating Systems.
 - 2) NIBCO
 - 3) Swagelok
 - b. NPS 2 (DN 50) and Smaller: Wrought-copper fitting with EPDM O-ring seal in each end.
 - c. NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Bronze fitting with stainless-steel grip ring and EPDM O-ring seal in each end.
- B. Hard Copper Tube: ASTM B 88, Type L (ASTM B 88M, Type B), water tube, drawn temper.

1. Copper, Solder-Joint Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.
2. Copper, Pressure-Seal Fittings:
 - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Viega; Plumbing & Heating Systems.
 - 2) NIBCO
 - 3) Swagelok
 - b. NPS 2 (DN 50) and Smaller: Wrought-copper fitting with EPDM O-ring seal in each end.
 - c. NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Bronze fitting with stainless-steel grip ring and EPDM O-ring seal in each end.
- C. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end. Furnish Class 300 flanges if required to match piping.
- D. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

2.2 DUCTILE-IRON PIPE AND FITTINGS

- A. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, with mechanical-joint bell and plain spigot end unless grooved or flanged ends are indicated.
 1. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 2. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.
- B. Push-on-Joint, Ductile-Iron Pipe: AWWA C151, with push-on-joint bell and plain spigot end unless grooved or flanged ends are indicated.
 1. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 2. Gaskets: AWWA C111, rubber.
- C. Grooved-Joint, Ductile-Iron Pipe: AWWA C151, with cut, rounded-grooved ends.
 1. Grooved-End, Ductile-Iron Pipe Appurtenances:
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Anvil International, Inc.
 - 2) Victaulic Company of America.

3) U.S. Pipe

- b. Grooved-End, Ductile-Iron Fittings: ASTM A 47/A 47M, malleable-iron castings or ASTM A 536, ductile-iron castings with dimensions matching pipe.
- c. Grooved-End, Ductile-Iron-Piping Couplings: AWWA C606, for ductile-iron-pipe dimensions. Include ferrous housing sections, gasket suitable for water, and bolts and nuts.

D. Flanges: ASME 16.1, Class 125, cast iron.

2.3 PE PIPE AND FITTINGS

A. PE, ASTM Pipe: ASTM D 2239, SIDR No. 5.3, 7, or 9; with PE compound number required to give pressure rating not less than 160 psig (1100 kPa).

- 1. Insert Fittings for PE Pipe: ASTM D 2609, made of PA, PP, or PVC with serrated male insert ends matching inside of pipe. Include bands or crimp rings.
- 2. Molded PE Fittings: ASTM D 3350, PE resin, socket- or butt-fusion type, made to match PE pipe dimensions and class.

B. PE, AWWA Pipe: AWWA C906, DR No. 7.3, 9, or 9.3; with PE compound number required to give pressure rating not less than 160 psig (1100 kPa).

- 1. PE, AWWA Fittings: AWWA C906, socket- or butt-fusion type, with DR number matching pipe and PE compound number required to give pressure rating not less than [160 psig (1100 kPa)].

C. PE, Fire-Service Pipe: ASTM F 714, AWWA C906, or equivalent for PE water pipe; FMG approved, with minimum thickness equivalent to FMG Class 150.

- 1. Molded PE Fittings: ASTM D 3350, PE resin, socket- or butt-fusion type, made to match PE pipe dimensions and class.

2.4 PVC PIPE AND FITTINGS

A. PVC, Schedule 40 Pipe: ASTM D 1785.

- 1. PVC, Schedule 40 Socket Fittings: ASTM D 2466.

B. PVC, Schedule 80 Pipe: ASTM D 1785.

- 1. PVC, Schedule 80 Socket Fittings: ASTM D 2467.
- 2. PVC, Schedule 80 Threaded Fittings: ASTM D 2464.

C. PVC, AWWA Pipe: AWWA C900, Class 150, with bell end with gasket, and with spigot end.

- 1. Comply with UL 1285 for fire-service mains if indicated.
- 2. PVC Fabricated Fittings: AWWA C900, Class 150, with bell-and-spigot or double-bell ends. Include elastomeric gasket in each bell.

3. PVC Molded Fittings: AWWA C907, Class 150, with bell-and-spigot or double-bell ends. Include elastomeric gasket in each bell.
4. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 - a. Gaskets: AWWA C111, rubber.
5. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 - a. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

2.5 SPECIAL PIPE FITTINGS

2.6 JOINING MATERIALS

- A. Refer to Division 22 Section "Common Work Results for Plumbing" for commonly used joining materials.
- B. Brazing Filler Metals: AWS A5.8, BCuP Series.
- C. Bonding Adhesive for Fiberglass Piping: As recommended by fiberglass piping manufacturer.
- D. Plastic Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

2.7 PIPING SPECIALTIES

- A. Transition Fittings: Manufactured fitting or coupling same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.
- B. Tubular-Sleeve Pipe Couplings:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cascade Waterworks Manufacturing.
 - b. Dresser, Inc.; Dresser Piping Specialties.
 - c. Ford Meter Box Company, Inc. (The); Pipe Products Div.
 - d. Hays Fluid Controls; a division of ROMAC Industries Inc.
 - e. JCM Industries.
 - f. Viking Johnson.
 2. Description: Metal, bolted, sleeve-type, reducing or transition coupling, with center sleeve, gaskets, end rings, and bolt fasteners and with ends of same sizes as piping to be joined.
 - a. Standard: AWWA C219.

- b. Center-Sleeve Material: Stainless steel.
- c. Gasket Material: Natural or synthetic rubber.
- d. Pressure Rating: 150 psig (1035 kPa) minimum.
- e. Metal Component Finish: Corrosion-resistant coating or material.

C. Split-Sleeve Pipe Couplings:

- 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Victaulic Depend-O-Lok.
 - b. Plidco
 - c. ROMAC
- 2. Description: Metal, bolted, split-sleeve-type, reducing or transition coupling with sealing pad and closure plates, O-ring gaskets, and bolt fasteners.
 - a. Standard: AWWA C219.
 - b. Sleeve Material: Stainless steel.
 - c. Sleeve Dimensions: Of thickness and width required to provide pressure rating.
 - d. Gasket Material: O-rings made of EPDM rubber, unless otherwise indicated.
 - e. Pressure Rating: 150 psig (1035 kPa) minimum.
 - f. Metal Component Finish: Corrosion-resistant coating or material.

D. Flexible Connectors:

- 1. Nonferrous-Metal Piping: Bronze hose covered with bronze wire braid; with copper-tube, pressure-type, solder-joint ends or bronze flanged ends brazed to hose.
- 2. Ferrous-Metal Piping: Stainless-steel hose covered with stainless-steel wire braid; with ASME B1.20.1, threaded steel pipe nipples or ASME B16.5, steel pipe flanges welded to hose.

E. Dielectric Fittings:

- 1. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
- 2. Dielectric Unions:
 - a. Description:
 - 1) Standard: ASSE 1079.
 - 2) Pressure Rating: 250 psig (1725 kPa).
 - 3) End Connections: Solder-joint copper alloy and threaded ferrous.
- 3. Dielectric Flanges:
 - a. Description:

- 1) Standard: ASSE 1079.
- 2) Factory-fabricated, bolted, companion-flange assembly.
- 3) Pressure Rating: 300 psig (2070 kPa).
- 4) End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

4. Dielectric-Flange Insulating Kits:

a. Description:

- 1) Nonconducting materials for field assembly of companion flanges.
- 2) Pressure Rating: 300 psig.
- 3) Gasket: Neoprene or phenolic.
- 4) Bolt Sleeves: Phenolic or polyethylene.
- 5) Washers: Phenolic with steel backing washers.

5. Dielectric Nipples:

a. Description:

- 1) Standard: IAPMO PS 66
- 2) Electroplated steel nipple, complying with ASTM F 1545.
- 3) Pressure Rating: 300 psig (2070 kPa) at 225 deg F (107 deg C).
- 4) End Connections: Male threaded or grooved.
- 5) Lining: Inert and noncorrosive, propylene.

2.8 CORROSION-PROTECTION PIPING ENCASEMENT

A. Encasement for Underground Metal Piping:

1. Standards: ASTM A 674 or AWWA C105.
2. Form: Tube.
3. Material: LLDPE film of 0.008-inch (0.20-mm) minimum thickness, or high-density, cross laminated PE film of 0.004-inch (0.10-mm) minimum thickness.
4. Color: Black.

2.9 GATE VALVES

A. AWWA, Cast-Iron Gate Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Cast Iron Pipe Co.; American Flow Control Div.
 - b. American Cast Iron Pipe Co.; Waterous Co. Subsidiary.
 - c. Crane Co.; Crane Valve Group; Stockham Div.
 - d. Mueller Co.; Water Products Div.
 - e. NIBCO INC.
 - f. U.S. Pipe and Foundry Company.

2. Nonrising-Stem, Metal-Seated Gate Valves:
 - a. Description: Gray- or ductile-iron body and bonnet; with cast-iron or bronze double-disc gate, bronze gate rings, bronze stem, and stem nut.
 - 1) Standard: AWWA C500.
 - 2) Minimum Pressure Rating: 200 psig (1380 kPa).
 - 3) End Connections: Mechanical joint.
 - 4) Interior Coating: Complying with AWWA C550.
 3. Nonrising-Stem, Resilient-Seated Gate Valves:
 - a. Description: Gray- or ductile-iron body and bonnet; with bronze or gray- or ductile-iron gate, resilient seats, bronze stem, and stem nut.
 - 1) Standard: AWWA C509.
 - 2) Minimum Pressure Rating: 200 psig (1380 kPa).
 - 3) End Connections: Mechanical joint.
 - 4) Interior Coating: Complying with AWWA C550.
 4. Nonrising-Stem, High-Pressure, Resilient-Seated Gate Valves:
 - a. Description: Ductile-iron body and bonnet; with bronze or ductile-iron gate, resilient seats, bronze stem, and stem nut.
 - 1) Standard: AWWA C509.
 - 2) Minimum Pressure Rating: 250 psig (1725 kPa).
 - 3) End Connections: Push on or mechanical joint.
 - 4) Interior Coating: Complying with AWWA C550.
 5. OS&Y, Rising-Stem, Metal-Seated Gate Valves:
 - a. Description: Cast- or ductile-iron body and bonnet, with cast-iron double disc, bronze disc and seat rings, and bronze stem.
 - 1) Standard: AWWA C500.
 - 2) Minimum Pressure Rating: 200 psig (1380 kPa).
 - 3) End Connections: Flanged.
 6. OS&Y, Rising-Stem, Resilient-Seated Gate Valves:
 - a. Description: Cast- or ductile-iron body and bonnet, with bronze or gray- or ductile-iron gate, resilient seats, and bronze stem.
 - 1) Standard: AWWA C509.
 - 2) Minimum Pressure Rating: 200 psig (1380 kPa).
 - 3) End Connections: Flanged.
- B. UL/FMG, Cast-Iron Gate Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Cast Iron Pipe Co.; American Flow Control Div.
 - b. American Cast Iron Pipe Co.; Waterous Co. Subsidiary.
 - c. Crane Co.; Crane Valve Group; Stockham Div.
 - d. Mueller Co.; Water Products Div.
 - e. NIBCO INC.
 - f. U.S. Pipe and Foundry Company.

2. UL/FMG, Nonrising-Stem Gate Valves:
 - a. Description: Iron body and bonnet with flange for indicator post, bronze seating material, and inside screw.
 - 1) Standards: UL 262 and FMG approved.
 - 2) Minimum Pressure Rating: 175 psig (1207 kPa).
 - 3) End Connections: Flanged.

3. OS&Y, Rising-Stem Gate Valves:
 - a. Description: Iron body and bonnet and bronze seating material.
 - 1) Standards: UL 262 and FMG approved.
 - 2) Minimum Pressure Rating: 175 psig (1207 kPa).
 - 3) End Connections: Flanged.

- C. Bronze Gate Valves:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Crane Co.; Crane Valve Group; Crane Valves.
 - b. Crane Co.; Crane Valve Group; Jenkins Valves.
 - c. Crane Co.; Crane Valve Group; Stockham Div.
 - d. Milwaukee Valve Company.
 - e. NIBCO INC.

 2. OS&Y, Rising-Stem Gate Valves:
 - a. Description: Bronze body and bonnet and bronze stem.
 - 1) Standards: UL 262 and FMG approved.
 - 2) Minimum Pressure Rating: 175 psig (1207 kPa).
 - 3) End Connections: Threaded.

 3. Nonrising-Stem Gate Valves:
 - a. Description: Class 125, Type 1, bronze with solid wedge, threaded ends, and malleable-iron handwheel.

- 1) Standard: MSS SP-80.

2.10 GATE VALVE ACCESSORIES AND SPECIALTIES

A. Tapping-Sleeve Assemblies:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. American Cast Iron Pipe Co.; Waterous Co. Subsidiary.
- b. Flowsolve.
- c. Mueller Co.; Water Products Div.
- d. U.S. Pipe and Foundry Company.

2. Description: Sleeve and valve compatible with drilling machine.

- a. Standard: MSS SP-60.
- b. Tapping Sleeve: Cast- or ductile-iron or stainless-steel, two-piece bolted sleeve with flanged outlet for new branch connection. Include sleeve matching size and type of pipe material being tapped and with recessed flange for branch valve.
- c. Valve: AWWA, cast-iron, nonrising-stem, resilient-seated gate valve with one raised face flange mating tapping-sleeve flange.

- ### B. Valve Boxes: Comply with AWWA M44 for cast-iron valve boxes. Include top section, adjustable extension of length required for depth of burial of valve, plug with lettering "WATER," and bottom section with base that fits over valve and with a barrel approximately 5 inches (125 mm) in diameter.

1. Operating Wrenches: Steel, tee-handle with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut.

- ### C. Indicator Posts: UL 789, FMG-approved, vertical-type, cast-iron body with operating wrench, extension rod, and adjustable cast-iron barrel of length required for depth of burial of valve.

2.11 CHECK VALVES

A. AWWA Check Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. American Cast Iron Pipe Co.; American Flow Control Div.
- b. Crane Co.; Crane Valve Group; Crane Valves.
- c. Crane Co.; Crane Valve Group; Stockham Div.
- d. Mueller Co.; Water Products Div.
- e. NIBCO INC.
- f. Watts Water Technologies, Inc.

2. Description: Swing-check type with resilient seat. Include interior coating according to AWWA C550 and ends to match piping.

- a. Standard: AWWA C508.
 - b. Pressure Rating: 175 psig (1207 kPa).
- B. UL/FMG, Check Valves:
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Cast Iron Pipe Co.; Waterous Co. Subsidiary.
 - b. Crane Co.; Crane Valve Group; Stockham Div.
 - c. Globe Fire Sprinkler Corporation.
 - d. Kidde Fire Fighting.
 - e. Reliable Automatic Sprinkler Co., Inc.
 - f. Tyco Fire & Building Products.
 - 2. Description: Swing-check type with pressure rating; rubber-face checks, unless otherwise indicated; and ends matching piping.
 - a. Standards: UL 312 and FMG approved.
 - b. Pressure Rating: 250 psig (1725 kPa).

2.12 DETECTOR CHECK VALVES

- A. Detector Check Valves:
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Ames Fire & Waterworks; a division of Watts Regulator Co.
 - b. Badger Meter, Inc.
 - c. FEBCO; SPX Valves & Controls.
 - d. Globe Fire Sprinkler Corporation.
 - e. Mueller Co.; Hersey Meters.
 - 2. Description: Galvanized cast-iron body, bolted cover with air-bleed device for access to internal parts, and flanged ends. Include one-piece bronze disc with bronze bushings, pivot, and replaceable seat. Include threaded bypass taps in inlet and outlet for bypass meter connection. Set valve to allow minimal water flow through bypass meter when major water flow is required.
 - a. Standards: UL 312 and FMG approved.
 - b. Pressure Rating: 175 psig (1207 kPa).
 - c. Water Meter: AWWA C700, disc type, at least one-fourth size of detector check valve. Include meter, bypass piping, gate valves, check valve, and connections to detector check valve.

2.13 BUTTERFLY VALVES

- A. AWWA and UL Butterfly Valves:
- 1. Basis-of-Design Product: Subject to compliance with requirements, provide the following:

- a. Bray / McCannolock
 - b. Nibco
 - c. DeZURIK
2. Description: RTFE seated with stainless steel rings and trim..
- a. Body: Stainless Steel.
 - b. Body Type Lug or double flanged.
 - c. Pressure Rating: 150 psig (1035 kPa).
 - d. Double offset seat minimum
 - e. Stainless steel one piece shaft
 - f. Provide materials and rating as necessary for any fire service application

2.14 PLUG VALVES

A. Plug Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Nordstrom
 - b. Walworth.
 - c. Milliken Valve Company.
2. Description: Resilient-seated eccentric.
 - a. Standard: MSS SP-108.
 - b. Body: Cast iron.
 - c. Pressure Rating: 175-psig (1207-kPa) minimum CWP.
 - d. Seat Material: Suitable for potable-water service.

2.15 WATER METERS

- A. Water meters will be furnished by utility company.

2.16 PRESSURE-REDUCING VALVES

A. Water Regulators:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Conbraco Industries, Inc.
 - b. Watts Water Technologies, Inc.
 - c. Wilkins; a Zurn company.
2. Standard: ASSE 1003.
3. Pressure Rating: Initial pressure of 150 psig (1035 kPa).
4. Size: as called for on plans
5. Body: Bronze for NPS 2 (DN 50) and smaller; cast iron for NPS 2-1/2 and NPS 3 (DN 65 and DN 80).

6. Valves for Booster Heater Water Supply: Include integral bypass.
7. End Connections: Threaded for NPS 2 (DN 50) and smaller; flanged for NPS 2-1/2 and NPS 3 (DN 65 and DN 80).

B. Water Control Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Flomatic Corporation.
 - b. Dresser
 - c. Watts Regulator Co.; Watts ACV Division.
 - d. Wilkins; a Zurn company.
2. Description: Pilot-operation, diaphragm-type, single-seated main water control valve with AWWA C550 or FDA-approved, interior epoxy coating. Include small pilot control valve, restrictor device, specialty fittings, and sensor piping.
 - a. Pressure Rating: Initial pressure of 150 psig (1035 kPa) minimum.
 - b. Main Valve Body: Cast- or ductile-iron body with AWWA C550 or FDA-approved, interior epoxy coating; or stainless-steel body.
 - 1) Trim: Stainless steel.
 - c. End Connections: Threaded for NPS 2 (DN 50) and smaller; [flanged] for NPS 2-1/2 (DN 65) and larger.

2.17 RELIEF VALVES

A. Air-Release Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Spirotop by Spirovent – no exceptions
 - b. Flomatic
 - c. DeZurik
2. Description: Hydromechanical device to automatically release accumulated air.
 - a. Standard: AWWA C512.
 - b. Pressure Rating: 300 psig (2070 kPa)
 - c. Body Material: Steel

2.18 BACKFLOW PREVENTERS

A. Reduced-Pressure-Principle Backflow Preventers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Conbraco Industries, Inc.
 - b. Flomatic Corporation.
 - c. Watts Water Technologies, Inc.
 - d. Wilkins; a Zurn company.

2. Standard: ASSE 1013 or AWWA C511.
 3. Operation: Continuous-pressure applications.
 4. Pressure Loss: 12 psig (83 kPa) maximum, through middle 1/3 of flow range.
 5. Body: Bronze for NPS 2 (DN 50) and smaller; stainless steel for NPS 2-1/2 (DN 65) and larger.
 6. End Connections: Threaded for NPS 2 (DN 50) and smaller; flanged for NPS 2-1/2 (DN 65) and larger.
 7. Configuration: Designed for horizontal, straight through flow.
 8. Accessories:
 - a. Valves: Ball type with threaded ends on inlet and outlet of NPS 2 (DN 50) and smaller; OS&Y gate type with flanged ends on inlet and outlet of NPS 2-1/2 (DN 65) and larger.
 - b. Air-Gap Fitting: ASME A112.1.2, matching backflow preventer connection.
- B. Double-Check, Backflow-Prevention Assemblies:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Conbraco Industries, Inc.
 - b. Flomatic Corporation.
 - c. Watts Water Technologies, Inc.
 - d. Wilkins; a Zurn company.
 2. Standard: ASSE 1015 or AWWA C510.
 3. Operation: Continuous-pressure applications, unless otherwise indicated.
 4. Pressure Loss: 5 psig (35 kPa) maximum, through middle 1/3 of flow range.
 5. Body: Bronze for NPS 2 (DN 50) and smaller; stainless steel for NPS 2-1/2 (DN 65) and larger.
 6. End Connections: Threaded for NPS 2 (DN 50) and smaller; flanged for NPS 2-1/2 (DN 65) and larger.
 7. Configuration: Designed for horizontal, straight through flow.
 8. Accessories: Ball valves with threaded ends on inlet and outlet of NPS 2 (DN 50) and smaller; OS&Y gate valves with flanged ends on inlet and outlet of NPS 2-1/2 (DN 65) and larger.
- C. Double-Check, Detector-Assembly Backflow Preventers:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Conbraco Industries, Inc.
 - b. Watts Water Technologies, Inc.
 - c. Wilkins; a Zurn company.
 2. Standards: ASSE 1048 and UL listed or FMG approved.
 3. Operation: Continuous-pressure applications.
 4. Pressure Loss: 5 psig (35 kPa) maximum, through middle 1/3 of flow range.
 5. Body: Cast iron with interior lining complying with AWWA C550 or that is FDA approved
 6. End Connections: Flanged.
 7. Configuration: Designed for horizontal, straight through flow.

8. Accessories:
 - a. Valves: UL 262, FMG-approved, OS&Y gate type with flanged ends on inlet and outlet.
 - b. Bypass: With displacement-type water meter, shutoff valves, and reduced-pressure backflow preventer.

2.19 PROTECTIVE ENCLOSURES

A. Freeze-Protection Enclosures:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Aqua Shield.
 - b. Hot Box, Inc.
 - c. Watts Water Technologies, Inc.
2. Description: Insulated enclosure designed to protect aboveground water piping, equipment, or specialties from freezing and damage, with heat source to maintain minimum internal temperature of 40 deg F (4 deg C) when external temperatures reach as low as minus 34 deg F (minus 36 deg C).
 - a. Standard: ASSE 1060.
 - b. Class I-V: For pressure or atmospheric vacuum breaker equipment or devices. Include drain opening in housing.
 - 1) Housing: Reinforced-fiberglass] construction.
 - a) Size: Of dimensions indicated, but not less than those required for access and service of protected unit.
 - b) Drain opening for units with drain connection.
 - c) Access doors with locking devices.
 - d) Insulation inside housing.
 - e) Anchoring devices for attaching housing to concrete base.
 - 2) Electric heating cable or heater with self-limiting temperature control.

B. Enclosure Bases:

1. Description: 4-inch- (100-mm-) minimum thickness precast concrete, of dimensions required to extend at least 6 inches (150 mm) beyond edges of enclosure housings. Include openings for piping.

2.20 FIRE HYDRANTS

A. Dry-Barrel Fire Hydrants:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American AVK Co.; Valves & Fittings Div.
 - b. American Cast Iron Pipe Co.; American Flow Control Div.
 - c. American Cast Iron Pipe Co.; Waterous Co. Subsidiary.
 - d. American Foundry Group, Inc.
 - e. East Jordan Iron Works, Inc.
 - f. Mueller Co.; Water Products Div.
 - g. Troy Valve; a division of Penn-Troy Manufacturing, Inc.
 - h. U.S. Pipe and Foundry Company.

2. Description: Freestanding, with one NPS 4-1/2 (DN 115) and two NPS 2-1/2 (DN 65) outlets, 5-1/4-inch (133-mm) main valve, drain valve, and NPS 6 (DN 150) mechanical-joint inlet. Hydrant shall have cast-iron body, compression-type valve opening against pressure and closing with pressure.
 - a. Standards: UL 246, FMG approved.
 - b. Pressure Rating: 250 psig (1725 kPa).
 - c. Outlet Threads: NFPA 1963, with external hose thread used by local fire department. Include cast-iron caps with steel chains.
 - d. Operating and Cap Nuts: Pentagon, 1-1/2 inches (38 mm) point to flat.
 - e. Direction of Opening: Open hydrant valve by turning operating nut to left or counterclockwise.
 - f. Exterior Finish: Red alkyd-gloss enamel paint, unless otherwise indicated.

2.21 ALARM DEVICES

- A. Alarm Devices, General: UL 753 and FMG approved, of types and sizes to mate and match piping and equipment.

- B. Water-Flow Indicators: Vane-type water-flow detector, rated for 250-psig (1725-kPa) working pressure; designed for horizontal or vertical installation; with 2 single-pole, double-throw circuit switches to provide isolated alarm and auxiliary contacts, 7 A, 125-V ac and 0.25 A, 24-V dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal when cover is removed.

- C. Supervisory Switches: Single pole, double throw; designed to signal valve in other than fully open position.

- D. Pressure Switches: Single pole, double throw; designed to signal increase in pressure.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Refer to Division 31 Section "Earth Moving" for excavating, trenching, and backfilling.

3.2 PIPING APPLICATIONS

- A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications.
- B. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used, unless otherwise indicated.
- C. Do not use flanges or unions for underground piping.
- D. Flanges, unions, grooved-end-pipe couplings, and special fittings may be used, instead of joints indicated, on aboveground piping and piping in vaults.
- E. Underground water-service piping NPS 3/4 to NPS 3 (DN 20 to DN 80 shall be the following:
1. PVC, Schedule [40 pipe; PVC, Schedule 40] [80 pipe; PVC, Schedule 80] socket fittings; and solvent-cemented joints.
- F. Underground water-service piping NPS 4 to NPS 8 (DN 100 to DN 200) shall be the following:
1. PVC, Schedule 40 pipe; PVC, Schedule 40 socket fittings; and solvent-cemented joints.
- G. Aboveground Water-Service Piping NPS 3/4 to NPS 3 (DN 20 to DN 80 shall be any of the following:
1. Hard copper tube, ASTM B 88, Type L (ASTM B 88M, Type B) wrought-copper, solder-joint fittings; and brazed joints.
 2. PVC, Schedule 80 pipe; socket fittings; and solvent-cemented joints.
- H. Aboveground water-service piping NPS 4 to NPS 8 (DN 100 to DN 200) range shall be any of the following:
1. Hard copper tube, ASTM B 88, Type L (ASTM B 88M, Type B); wrought-copper, solder-joint fittings; and brazed joints.
 2. PVC, Schedule 80 pipe; socket fittings; and solvent-cemented joints.
- I. Underground Fire-Service-Main Piping NPS 4 to NPS 12 (DN 100 to DN 300 shall be the following:
1. Ductile-iron, mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical joints.
- J. Aboveground Fire-Service-Main Piping NPS 4 to NPS 12 (DN 100 to DN 300) shall be ductile-iron, grooved-end pipe; ductile-iron-pipe appurtenances; and grooved joints.

3.3 VALVE APPLICATIONS

- A. General Application: Use mechanical-joint-end valves for NPS 3 (DN 80) and larger underground installation. Use threaded- or flanged-end valves for installation in vaults. Use UL/FMG, nonrising-stem gate valves for installation with indicator posts. Use corporation valves and curb valves with ends compatible with piping, for NPS 2 (DN 50) and smaller installation.
- B. Drawings indicate valve types to be used.

3.4 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. See Division 22 Section "Common Work Results for Plumbing" for piping-system common requirements.

3.5 PIPING INSTALLATION

- A. Water-Main Connection: Arrange with utility company for tap of size and in location indicated in water main.
- B. Comply with NFPA 24 for fire-service-main piping materials and installation.
 - 1. Install PE corrosion-protection encasement according to ASTM A 674 or AWWA C105.
 - 2. Install copper tube and fittings according to CDA's "Copper Tube Handbook."
- C. Install ductile-iron, water-service piping according to AWWA C600 and AWWA M41.
 - 1. Install PE corrosion-protection encasement according to ASTM A 674 or AWWA C105.
- D. Install PE pipe according to ASTM D 2774 and ASTM F 645.
- E. Install PVC, AWWA pipe according to ASTM F 645 and AWWA M23.
- F. Bury piping with depth of cover over top at least 30 inches (750 mm, with top at least below level of maximum frost penetration, and according to the following:
 - 1. In Loose Gravelly or Sandy type Soil and Rock: With at least 12 inches (300 mm)] additional cover.
- G. Install piping by tunneling or jacking, or combination of both, under streets and other obstructions that cannot be disturbed.
- H. Extend water-service piping and connect to water-supply source and building-water-piping systems at outside face of building wall in locations and pipe sizes indicated.
 - 1. Terminate water-service piping at building wall until building-water-piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building-water-piping systems when those systems are installed.

- I. Sleeves are specified in Division 22 Section "Sleeves and Sleeve Seals for Plumbing Piping."
- J. Mechanical sleeve seals are specified in Division 22 Section "Sleeves and Sleeve Seals for Plumbing Piping."
- K. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.
- L. See Division 21 Section "Water-Based Fire-Suppression Systems" for fire-suppression-water piping inside the building.
- M. See Division 22 Section "Domestic Water Piping" for potable-water piping inside the building.

3.6 JOINT CONSTRUCTION

- A. See Division 22 Section "Common Work Results for Plumbing" for basic piping joint construction.
- B. Make pipe joints according to the following:
 - 1. Copper-Tubing, Pressure-Sealed Joints: Use proprietary crimping tool and procedure recommended by copper, pressure-seal-fitting manufacturer.
 - 2. Ductile-Iron Piping, Gasketed Joints for Water-Service Piping: AWWA C600 and AWWA M41.
 - 3. Ductile-Iron Piping, Gasketed Joints for Fire-Service-Main Piping: UL 194.
 - 4. PE Piping Insert-Fitting Joints: Use plastic insert fittings and fasteners according to fitting manufacturer's written instructions.
 - 5. PVC Piping Gasketed Joints: Use joining materials according to AWWA C900. Construct joints with elastomeric seals and lubricant according to ASTM D 2774 or ASTM D 3139 and pipe manufacturer's written instructions.
 - 6. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
 - a. Dielectric Fittings for NPS 2 (DN 50) and Smaller: Use dielectric unions.
 - b. Dielectric Fittings for NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Use dielectric flange kits.
 - c. Dielectric Fittings for NPS 5 (DN 125) and Larger: Use dielectric flange kits.

3.7 VALVE INSTALLATION

- A. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.
- B. AWWA Valves Other Than Gate Valves: Comply with AWWA C600 and AWWA M44.
- C. UL/FMG, Gate Valves: Comply with NFPA 24. Install each underground valve and valves in vaults with stem pointing up and with vertical cast-iron indicator post.
- D. UL/FMG, Valves Other Than Gate Valves: Comply with NFPA 24.

- E. MSS Valves: Install as component of connected piping system.
- F. Pressure-Reducing Valves: Install in vault or aboveground between shutoff valves. Install full-size valved bypass.
- G. Relief Valves: Comply with AWWA C512. Install aboveground with shutoff valve on inlet.

3.8 DETECTOR-CHECK VALVE INSTALLATION

- A. Install aboveground.
- B. Install for proper direction of flow. Install bypass with water meter, gate valves on each side of meter, and check valve downstream from meter.
- C. Support detector check valves, meters, shutoff valves, and piping on brick or concrete piers.

3.9 ROUGHING-IN FOR WATER METERS

- A. Rough-in piping and specialties for water meter installation according to utility company's written instructions.

3.10 VACUUM BREAKER ASSEMBLY INSTALLATION

- A. Install pressure vacuum breaker assemblies of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.
- B. Do not install pressure vacuum breaker assemblies in vault or other space subject to flooding.

3.11 BACKFLOW PREVENTER INSTALLATION

- A. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.
- B. Do not install backflow preventers that have relief drain in vault or in other spaces subject to flooding.
- C. Do not install bypass piping around backflow preventers.
- D. Support NPS 2-1/2 (DN 65) and larger backflow preventers, valves, and piping near floor and on brick or concrete piers.

3.12 PROTECTIVE ENCLOSURE INSTALLATION

- A. Install concrete base level and with top approximately 2 inches (50 mm) above grade.
- B. Install protective enclosure over valves and equipment.
- C. Anchor protective enclosure to concrete base.

3.13 FIRE HYDRANT INSTALLATION

- A. General: Install each fire hydrant with separate gate valve in supply pipe, anchor with restrained joints or thrust blocks, and support in upright position.
- B. Wet-Barrel Fire Hydrants: Install with valve below frost line. Provide for drainage.
- C. AWWA Fire Hydrants: Comply with AWWA M17.
- D. UL/FMG Fire Hydrants: Comply with NFPA 24.

3.14 ALARM DEVICE INSTALLATION

- A. General: Comply with NFPA 24 for devices and methods of valve supervision. Underground valves with valve box do not require supervision.
- B. Locking and Sealing: Secure unsupervised valves as follows:
 - 1. Valves: Install chain and padlock on open OS&Y gate valve.
 - 2. Post Indicators: Install padlock on wrench on indicator post.
- C. Pressure Switches: Drill and thread hole in exposed barrel of fire hydrant. Install switch.
- D. Water-Flow Indicators: Install in water-service piping in vault. Select indicator with saddle and vane matching pipe size. Drill hole in pipe, insert vane, and bolt saddle to pipe.
- E. Connect alarm devices to building fire alarm system. Wiring and fire-alarm devices are specified in Division 28 Section "Fire Detection and Alarm."

3.15 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. See Division 22 Section "Common Work Results for Plumbing" for piping connections to valves and equipment.
- C. Connect water-distribution piping to utility water main. Use tapping sleeve and tapping valve.

- D. Connect water-distribution piping to interior domestic water and fire-suppression piping.
- E. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- F. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.16 FIELD QUALITY CONTROL

- A. Piping Tests: Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.
- B. Hydrostatic Tests: Test at not less than one-and-one-half times working pressure for two hours.
 - 1. Increase pressure in 50-psig (350-kPa) increments and inspect each joint between increments. Hold at test pressure for 1 hour; decrease to 0 psig (0 kPa). Slowly increase again to test pressure and hold for 1 more hour. Maximum allowable leakage is 2 quarts (1.89 L) per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within allowed limits.
- C. Prepare reports of testing activities.

3.17 IDENTIFICATION

- A. Install continuous underground detectable warning tape during backfilling of trench for underground water-distribution piping. Locate below finished grade, directly over piping. Underground warning tapes are specified in Division 31 Section "Earth Moving."
- B. Permanently attach equipment nameplate or marker indicating plastic water-service piping, on main electrical meter panel. See Division 22 Section "Common Work Results for Plumbing" for identifying devices.

3.18 CLEANING

- A. Clean and disinfect water-distribution piping as follows:
 - 1. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
 - 2. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 or do as follows:
 - a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow to stand for 24 hours.

- b. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.
 - c. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.
- B. Prepare reports of purging and disinfecting activities.

END OF SECTION 22 11 13

DCS Project No.:	BI-T-604	Meeting Purpose:	
Date:	January 4, 2017	<input checked="" type="checkbox"/>	Pre-Bid Meeting
Meeting Start Time:	9:00am	<input type="checkbox"/>	Post Bid Review Meeting
Meeting Location:	Plaza Level Meeting Room C	<input type="checkbox"/>	Other:

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DCS Project No.:	BI- T- 604	Meeting Purpose:
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Meeting Start Time:	9:30 am	<input type="checkbox"/> Post Bid Review Meeting
Meeting Location:	Plaza Level Meeting Room C	<input type="checkbox"/> Other:

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Street:		Phone:	
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Company/Department:		E-mail:	
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