

ADDENDUM No. 2

Project: **Washtenaw - Addition**
Location: 7400 South Huron River Dr., Ypsilanti, MI, 48197
Contract No: Y21456 File No: 511/21326.CAK DMVA No: 26C8022016
A/E File #: 2105-01
Date: August 15th, 2022

Item 1: Modify MICH Spec Section 00300 Bid Summary to include the below deductive alternates. Refer to enclosed Reissued MICH Spec Section 00300 and noted drawing C 1.0.

A. Alternate Bid Deduct #1:

- a. Southern Gravel Parking lot (gravel parking lot and associated site work appx 64,922 sf)
- b. Fence surrounding southern gravel parking lot and (2) vehicle gates. (Appx 918 LF of 8'-0" high chain link barbed wire fence)
- c. Associated site lighting and circuiting.

B. Alternate Bid Deduct #2

- a. North Asphalt parking lot (Asphalt parking lot and associated site work appx. 29,885 sf)
- b. Associated site lighting and circuiting

Item 2: Modify Soil Erosion Control Maintenance Schedule and Notes chart on sheet C-7.0 to remove Rob Macleod and associated information as the soil erosion control contact. Replace with the following contract information:

- i. Julie Werner
WernerJ1@michigan.gov , Julie.a.werner6.nfg@army.mil ,
(517) 481-7634 (office)
(517) 243-6524 (cell)
DVMA – CFMO Environmental
3423 N. Martin Luther King Jr. Blvd.
Lansing, Michigan 48906-2934

Item 3: Modify Key Note #5 on A-102 to remove reference to fire sprinkler system. Refer to M-101 for the extent of fire sprinkler system.

Item 4: Modify detail 3 on S-201 to detail the concrete vault ceiling to be 9" thick overall.

Item 5: Modify Elevation 2 on A-204 to remove (3) notes stating the following: "NEW PRIMARY ROOF DRAIN". Primary roof drains will be connected to underground storm drainage. Refer to drawings M-200A and M-201A.

I. Questions and Answers from the Pre-Bid Meeting on 8/4/22:

Question 1: Are 'Hiney Hiders Solid Plastic' toilet partitions an acceptable alternative to 'Bradley Series 400'?

Answer 1: Modify Specification Section 10 21 13 Par. 2.2.A to include 'Hiney Hiders Solid Plastic' as an acceptable alternate to 'Bradley Series 400'.

Question 2: Are 'Tuftec Benches' an acceptable alternate to 'Hardwood Maple Benches on cast iron pedestals'?

Answer 2: Modify Specification section 10 51 43 to list 'Tuftec Benches as an acceptable alternate to hardwood maple benches.

Question 3: Are 'Tufftec Lockers' and acceptable solution to 'ASI Storage Solutions'?

Answer 3: No, this is not an acceptable alternate.

Question 4: Please clarify spec section 21 11 00-2.5-D which references CPVC piping and accessories. Is CPVC piping allowed in this project?

Answer 4: No, CPVC piping is not allowed in this project. Refer to reissued spec section 21 11 00 for clarification.

Question 5: Are 1" grooved fire sprinkler fittings acceptable to use?

Answer 5: Though the product is available, PBA does not allow the smaller grooved fittings for the smaller piping. Please follow the latest application schedule in 21 11 00-3.4A.

Question 6: Are fire sprinkler branch line test fittings required?

Answer 6: Branch line test fittings are not required per NFPA and therefore are not required under this project.

Question 7: Can as-built fire suppression drawings be provided?

Answer 7: As-built fire suppression drawings are not available.

Question 8: The kitchen [Scullery128] doesn't show that ceiling needs to be opened to install the fire suppression - what needs to happen there. Is that a concrete ceiling or a drywall ceiling?

Answer 8: The existing ceiling in the Kitchen [Scullery 128] is exposed concrete plank with surface mounted lighting and equipment.

Question 9: Clarify the intent of fire suppression in offices 134 and 132. Drawing A-102 appears to conflict with M-101.

Answer 9: M-101 supersedes A-102 regarding fire suppression instructions.

END OF ADDENDUM

ADDENDUM

PBA Project Name: GHF SOM DMVA Washtenaw Armory Reno
PBA Project Number: 2021.0363.00
Addendum Number: 02
Date: August 15, 2022

Each Bidder's proposal shall include the work described herein.

Unless otherwise indicated, the work described herein shall comply with, and be equal in all respects to, the original Specifications and the Drawings accompanying same. Include incidental work required to properly complete the work, whether stated herein or not.

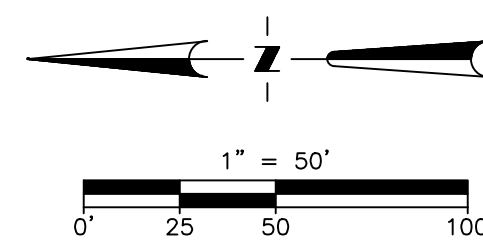
Specifications Issued: 211100

Drawings Issued: None.

Mechanical Specification Items:

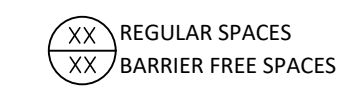
- MS-1 Refer to Section 211100 – Fire Suppression
1. Remove reference to CPVC in section 2.5-D.
 2. Remove reference to CPVC in section 3.4-A.

End of Addendum.



EXISTING PARKING (FROM TOPO)

173	REGULAR SPACES
7	BARRIER FREE SPACES
180	TOTAL PARKING SPACES



PROPOSED PARKING

EX. REGULAR SPACES:	133
EX. BARRIER FREE SPACES:	7
REGULAR SPACES:	215
BARRIER FREE SPACES:	0
TOTAL PARKING PROVIDED:	355

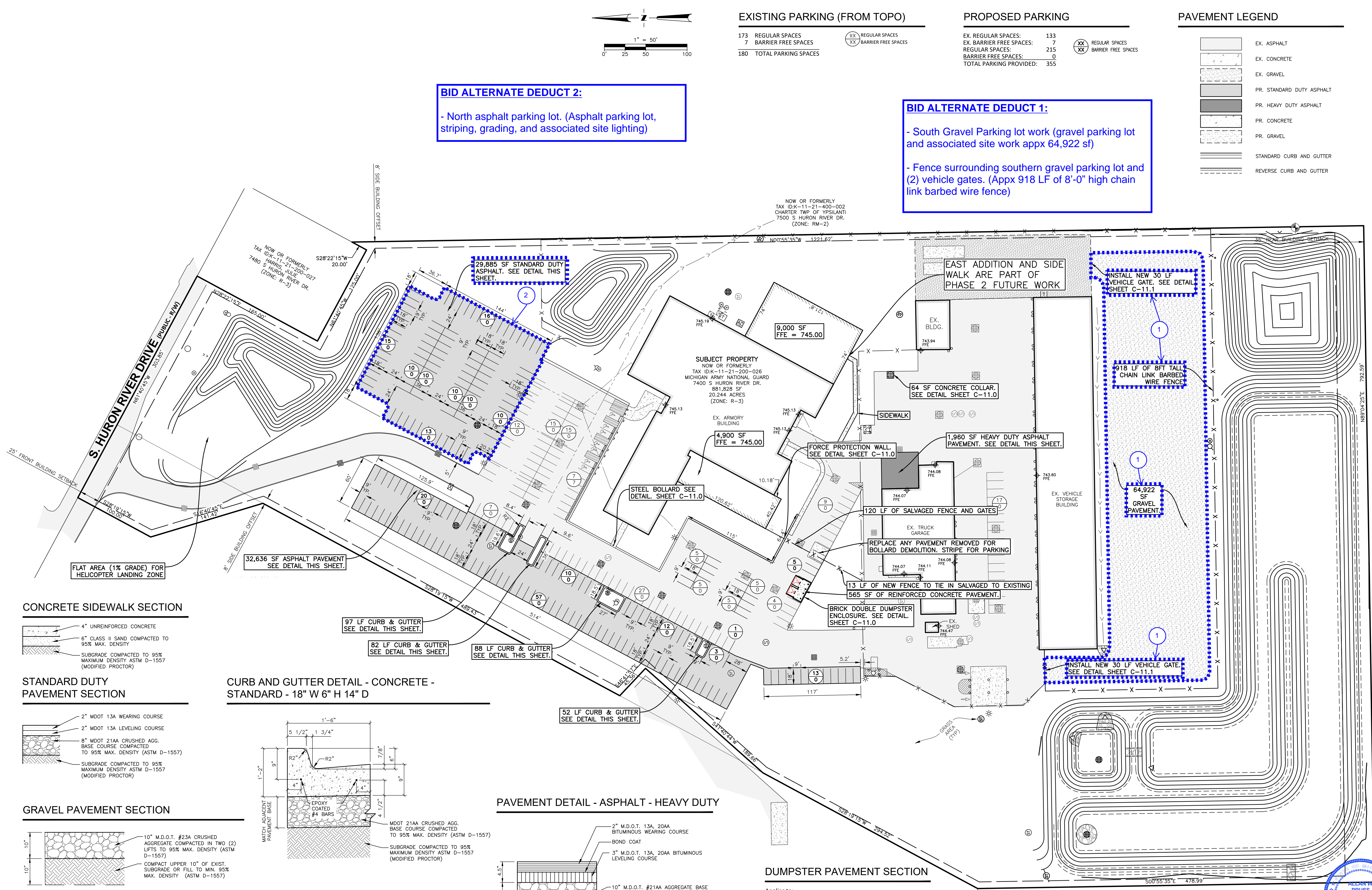


PAVEMENT LEGEND

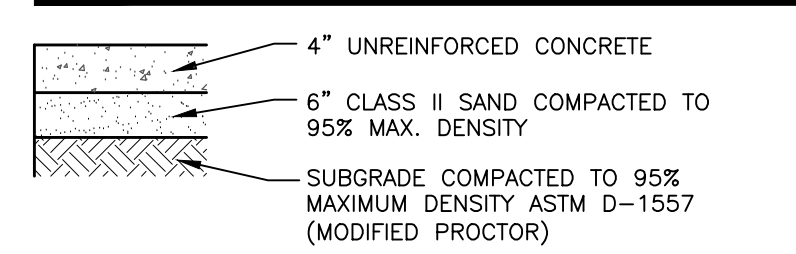
[Symbol]	EX. ASPHALT
[Symbol]	EX. CONCRETE
[Symbol]	EX. GRAVEL
[Symbol]	PR. STANDARD DUTY ASPHALT
[Symbol]	PR. HEAVY DUTY ASPHALT
[Symbol]	PR. CONCRETE
[Symbol]	PR. GRAVEL
[Symbol]	STANDARD CURB AND GUTTER
[Symbol]	REVERSE CURB AND GUTTER

BID ALTERNATE DEDUCT 2:
 - North asphalt parking lot. (Asphalt parking lot, striping, grading, and associated site lighting)

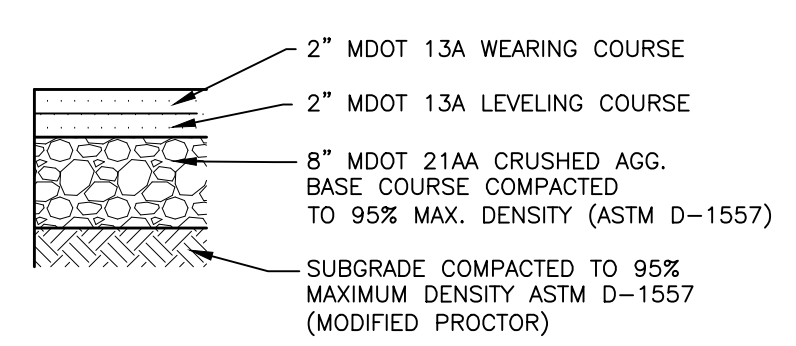
BID ALTERNATE DEDUCT 1:
 - South Gravel Parking lot work (gravel parking lot and associated site work appx 64,922 sf)
 - Fence surrounding southern gravel parking lot and (2) vehicle gates. (Appx 918 LF of 8'-0" high chain link barbed wire fence)



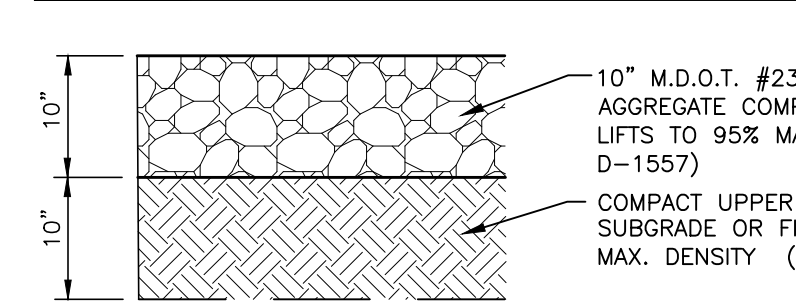
CONCRETE SIDEWALK SECTION



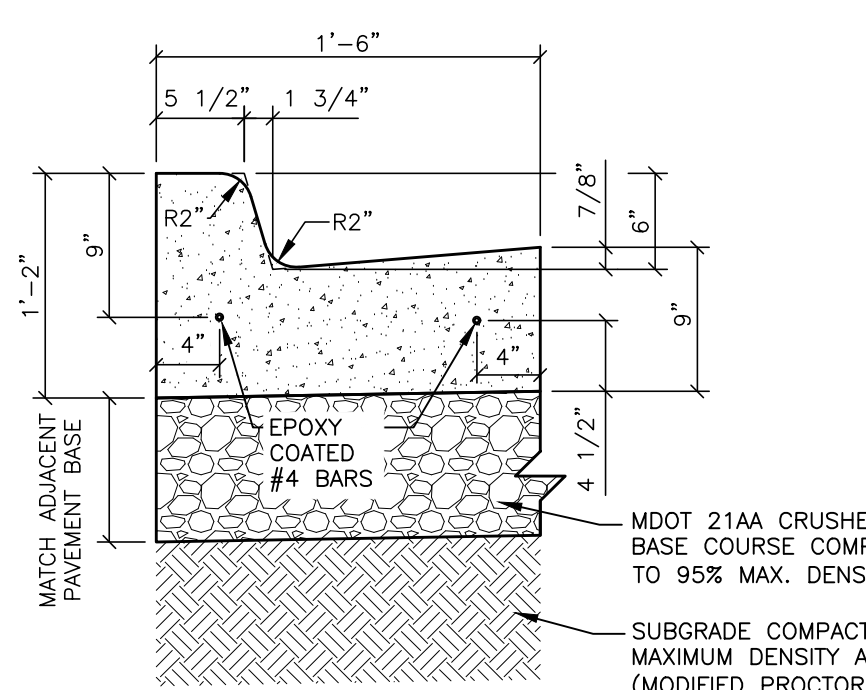
STANDARD DUTY PAVEMENT SECTION



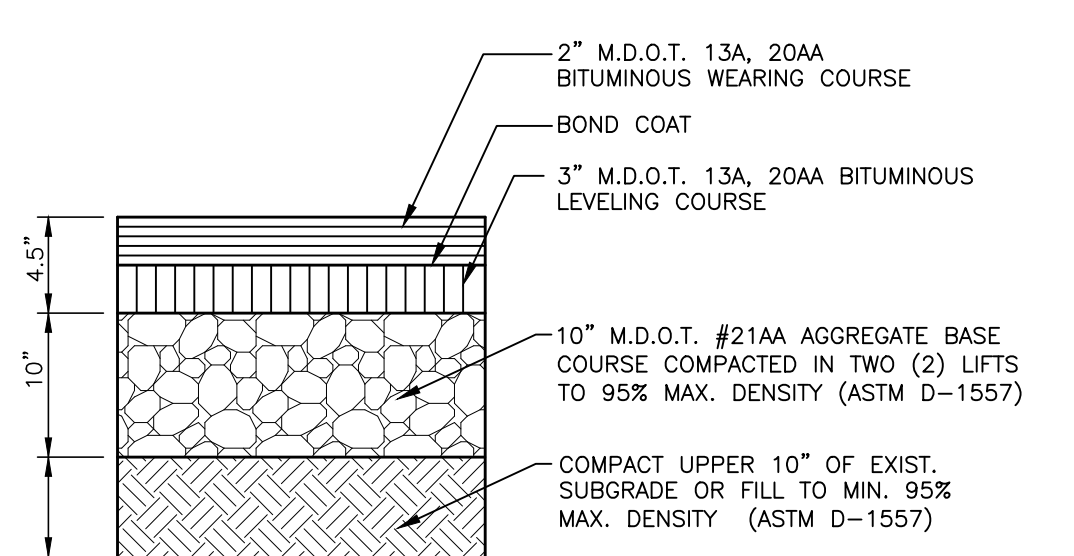
GRAVEL PAVEMENT SECTION



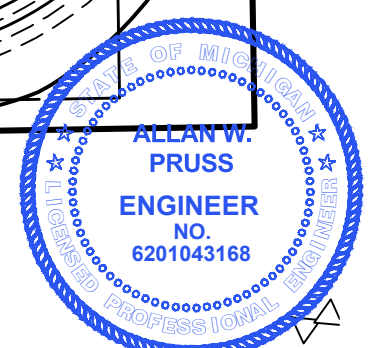
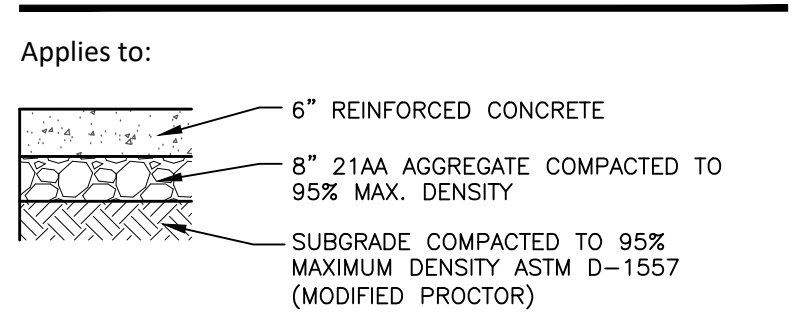
CURB AND GUTTER DETAIL - CONCRETE - STANDARD - 18" W 6" H 14" D



PAVEMENT DETAIL - ASPHALT - HEAVY DUTY



DUMPSTER PAVEMENT SECTION



SECTION 00300 – BID SUMMARY

DTMB-0401M (R 03/21)

BID SUMMARY
DEPARTMENT OF TECHNOLOGY, MANAGEMENT AND BUDGET

STATE FACILITIES ADMINISTRATION
DESIGN AND CONSTRUCTION DIVISION
3111 W. St. Joseph Street
Lansing, Michigan 48917

Bids must be submitted electronically through the SIGMA VSS website at
<https://sigma.michigan.gov/webapp/PRDVSS2X1/AltSelfService>

FILE NUMBER 511/21326.CAK	FUNDING CODE	DEPARTMENT/AGENCY 511	
CONTRACT TIME(S) 365 Calendar Days	PROJECT NAME Renovate Armory - Washtenaw	LOCATION 7400 South Huron River Drive Ypsilanti, MI 48197	
BID OPENING DATE August 24, 2022 at 2:00 pm ET		FOR AN EXAMINATION OF THE SITE CONTACT: Josh Boyd (734) 680 3026	
SEE SECTION 00100 INSTRUCTIONS TO BIDDERS AND SECTION 00700 GENERAL CONDITIONS PROVIDED WITH THE BIDDING DOCUMENTS. BID: WE PROPOSE TO FURNISH, PERFORM AND COMPLETE THE ENTIRE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS IN CONSIDERATION OF THE BID PRICE (S) STATED BELOW.			
FIRM NAME AND COMPLETE ADDRESS		TELEPHONE NUMBER and E-MAIL ADDRESS	
<input type="checkbox"/> Qualified Disabled Veteran BIDDER'S SIGNATURE AND TITLE _____ DATE _____		SIGMA VENDOR NUMBER	
		<small>(protected information required for processing payments)</small>	
		WITNESS' SIGNATURE _____	DATE _____

By signing this bid above, bidder certifies their enclosed Qualified Disabled Veteran and Michigan-Based Business Certifications.

BASE BID FROM BID SCHEDULE (Include specified Provisionary Allowance of \$125,000):

_____ Dollars \$ _____ <small>(use words) (in figures)</small>
Alternate 1: (Subtract) _____ Dollars \$ _____ <small>(use words) (in figures)</small>
Alternate 2: (/Subtract) _____ Dollars \$ _____ <small>(use words) (in figures)</small>

A PERFORMANCE BOND AND A PAYMENT BOND ARE REQUIRED FOR ALL BIDS OVER \$50,000.00. EACH BID MUST BE ACCOMPANIED BY A FIVE (5) PERCENT BID GUARANTEE. BUILDERS RISK INSURANCE IS REQUIRED TO BE PROVIDED BY THE CONTRACTOR UNLESS OTHERWISE INDICATED IN THE BID DOCUMENTS.

BIDDERS ARE ALSO CAUTIONED TO FAMILIARIZE THEMSELVES WITH ALL OF THE OTHER CONDITIONS OF THE CONTRACT.

Project Scope of Work:

Construct approximately 4,600 SF addition to the existing armory. Addition to be masonry construction with EPDM roof. New program to include vault, storage, and physical training room. New masonry partitions, acoustic ceiling tiles, doors, hardware and finishes. New mechanical including roof top units, plumbing and controls. New lighting, power, data and fire alarm. Renovate existing armory including toilet and shower rooms and locker rooms. New masonry and gypsum board partitions, acoustic ceiling tiles and gypsum board ceilings, doors, hardware and finishes. New mechanical including roof top units, plumbing and controls. New lighting, power, data and fire alarm.

Fire sprinklers will be added throughout the Armory. Fire alarm will be extended to the addition. Civil work includes parking lots, detention pond, fencing and force protection wall.

The Bidder must figure its Base Bid on the specified, or Addendum-approved, materials and equipment **only**. No "or equal" or substitution proposals will be permitted after Bid opening, except as provided in the General Conditions.

Addenda: Bidder acknowledges receipt of Addenda: No. ___ dated: _____, No. ___ dated: _____ No. ___ dated: _____

SECTION 00300 BID FORM

PROFESSIONAL – G.H. Forbes Associates Architects

WORK – Renovate Armory – Washtenaw

AGENCY No. –511 FUNDING CODE. _____ FILE No. 511/21326.CAK

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8 BID SUBMITTED	—

ARTICLE 1 THIS BID IS SUBMITTED TO THE STATE OF MICHIGAN ("the Owner").

1.1. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an agreement with the **Owner** on the form in Section 00500 Agreement and to furnish and perform the Work as specified or indicated in the Bidding Documents for the Bid prices in the "Bid Schedule" on this Section 00300 Bid Form, within the Contract Times specified in Section 00500 Agreement, and in accordance with all other provisions and terms and conditions of the Bidding Documents, including, without limitation, those dealing with the disposition of the Bid Security.

1.2. The undersigned Bidder agrees to hold this Bid open for acceptance by the **Owner** for the period specified in Article 9 of Section 00030 Advertisement.

STATE OF MICHIGAN MODEL
Developed from FORMSPEC™ Michigan Model

1.3. The Bidder will provide a signed original of Section 00500 Agreement, the executed Section 00610 Performance Bond, the executed Section 00620 Payment Bond, and appropriate evidence of insurance within the times and in the manner specified in the Bidding Documents.

ARTICLE 2 THE BIDDER'S REPRESENTATIONS

2.1. The Bidder has examined the Bidding Documents, including the Addenda acknowledged in the table below. The Bidder has verified that the Addenda acknowledged below include all issued Addenda. Except for Addenda, which solely revise the date of Bid, opening, failure by the Bidder to acknowledge receipt of all Addenda correctly, by either failing to complete or incorrectly completing the table below, shall justify the Owner's refusal to read the Bid and automatically disqualify the Bidder from any consideration for award of the Contract.

No. ___ Dated _____ No. ___ Dated _____

No. ___ Dated _____ No. ___ Dated _____

No. ___ Dated _____ No. ___ Dated _____

2.2. The Bidder has taken those steps that are reasonably necessary to (a) ascertain and become familiar with the Work, site, and locality; (b) account for all applicable federal, state, and other local Laws and all general, local, and prevailing conditions that may in any manner affect cost, schedule, progress, performance or furnishing of the Work; and (c) study and account for the terms and conditions of the Bidding Documents. The Bidder has carefully correlated the Bidder's observations with the Bidding Documents.

2.3. The Bidder has studied carefully all reports concerning subsurface conditions and drawings of physical conditions of existing surface and subsurface facilities that have been used by the **Professional** and all documents of physical conditions of existing Underground Utilities facilities that have been used by the **Professional** – in both cases as identified in Section 00210

Information for bidders. The Bidder assumes responsibility for carefully and accurately locating existing Underground Utilities in a manner consistent with paragraph 10.3 of Section 00700 General Conditions and as required by 1974 PA 53, as amended, MCL 460.701 *et seq.* The Bidder accepts the determinations set forth in the Bidding Documents as to the extent of such Authorized Technical Data and Underground Utilities information and data contained in those reports, drawings, documents, or the Bidding Documents, as applicable, upon which the Bidder may rely.

2.4. To the extent Additional Technical Data has been considered by the Bidder as necessary for determining the Bid in Article 6 Bid Schedule, and the **Owner**, upon request, did not have the necessary Additional Technical Data, the Bidder assumes responsibility for having undertaken or undertaking reasonable examinations of the site and any other pertinent available information and data. The Bidder agrees to perform and furnish the Work affected by the conditions involved, at no increase in Contract Price and Contract Time, to the extent the information and data necessary for determining the Bid could have been discovered through reasonable examinations of the site and any other pertinent information and data available (including, but not limited to the information and data designated in Section 00210 Information for Bidders).

2.5. The Bidder has carefully correlated the results of its observations, examinations, and studies of those reports of explorations and all that information and data in studies, drawings, and specifications, referred to in paragraphs 2.3 and 2.4, with the terms and conditions of the Bidding Documents.

2.6. The Bidder has examined all information and data shown or indicated in the Bidding Documents concerning other work, including, but not limited to provisions in Section 00700 General Conditions. The Bidder assumes responsibility for all reasonably foreseeable terms, conditions and consequences resulting from other work that may in any manner affect cost, schedule, progress, performance or furnishing of the Work.

2.7. The Bidder has carefully examined the terms and conditions of the Bidding Documents concerning Delay, Activity Float times and early completion. The Bidder agrees that increases in Contract Price and/or Contract Time for Delay shall be as provided in Section 00700 General Conditions. The Bidder has correlated those terms and conditions with the Bidder's schedule for the Work and its Base Bid and Alternates.

2.8. The Bidder represents that each unit price covering Specified or Contingent Unit Price Work, whether bid on Article 6 – Bid Schedule or on Article 7 – Schedule of Change Order Prices, includes sufficient amounts to cover (a) all labor costs, Subcontractor costs, material and equipment costs, construction equipment costs and general conditions costs, and (b) all administrative costs and home office overhead), and (c) profit. The **Owner** reserves the right to reject any unit prices bid on paragraph 6.2 Schedule of Alternates or in Article 7 Schedule of Change Order Prices, which, in the **Owner's** sole discretion, are not in the **Owner's** best interest.

2.9. The Bidder has given the **Professional** written notice of all conflicts, ambiguities, errors, or omissions the Bidder has discovered in the Bidding Documents, and the written resolution given by the **Professional** is acceptable to the Bidder.

2.10. This Bid is genuine, is not made in the interest of or on behalf of any undisclosed person and is not submitted in conformity with any agreement or rules of any group, association, organization, or corporation. To induce the **Owner** into consideration of this Bid, the Bidder reiterates and makes each of the representations made by the Bidder in Section 00320 Non-collusion Affidavit attached to this Section 00300 Bid Form.

2.11. The Bidder is aware of the **Owner's** requirements for business owned by minorities, women, and persons with physical or mental disabilities, and assumes responsibility for all conditions and consequences that may result from meeting those requirements and that may in any manner affect cost, schedule, progress, performance and furnishing of the Work.

2.12. The Bidder has read and studied each provision of the Bidding Documents. The Bidder has no expectations different from the terms and conditions of the Bidding Documents.

ARTICLE 3 TIME OF COMPLETION

3.1. The Contract Times are specified in paragraph 4.1 of Section 00500 Agreement. The Bidder has carefully correlated the provisions in paragraph 4.1 of Section 00500 Agreement with the other terms and conditions of the Bidding Documents and unequivocally accepts the Contract Times for the Work, and any other designated parts of the Work, as specified.

3.2. The Bidder unequivocally accepts the liquidated damage provisions specified in paragraph 4.2 of Section 00500 Agreement in the event of any failure, neglect, or refusal to complete the Work, or designated part of the Work, within the corresponding Contract Times specified in paragraph 4.1 of Section 00500 Agreement.

ARTICLE 4 ATTACHMENTS INCLUDED WITH THIS BID

4.1. Attachments to this Section 00300 Bid Form and made a condition of this Bid are:

4.1.1. Evidence of Authority to Sign the Bid.

4.1.2. Section 00310 Bid Bond, with the attached certified copy of Power of Attorney, or

Alternate Bid Security.

4.1.3. Section 00320 Non-collusion Affidavit.

TO BE PROVIDED POST BID WITH SECTION 00400 SUBMITTALS:

4.1.5 Current EMR Rating

4.1.6 Identification of the proposed project superintendent with a resume or list of similar projects handled by that individual.

4.1.7 A list of at least three (3) projects completed within the last three (3) years of similar size and complexity, with contact information for references for each.

4.2. Bidder-provided documents, made a condition of this Bid, are as required in the following Section(s) of the Bidding Documents:

ARTICLE 5 DEFINED TERMS

5.1. Section 00020 Glossary assigns specific intent and meanings to capitalized terms and to other defined terms used in (a) this Section 00300 Bid Form, (b) Section 00310 Bid Bond and Section 00320 Non-collusion Affidavit), and (c) Section 00410 Bid Breakdown, Section 00420 Questionnaire, Section 00430 List of Subcontractors and Section 00440 Schedule of Materials and Equipment.

ARTICLE 6 BID SCHEDULE

6.1 Base Bid Schedule - The Bidder will complete the Work and accept in full payment, for the Work items listed, the following unit prices and/or Bid Prices, as applicable:

Base Bid Item No.	Bid Quantity	Description (Bidder to write price in Words)	Unit Price	Item Bid Price
ADDITION:				
Site Work				
Concrete				
Masonry				
Metals				
Wood + Plastics				
Thermal and Moisture				
Doors and Windows				
Finishes				
Plumbing				
HVAC				
Electrical				
Exterior Improvements				
Balance of Addition Work				
RENOVATION:				
Demolition				
Concrete				
Masonry				
Metals				
Wood + Plastics				
Thermal and Moisture				
Doors and Windows				
Finishes				
Toilet Accessories				
Plumbing				
HVAC				
Electrical				

Balance of Renovation Work				
		HVAC CONTROLS ALLOWANCE AMOUNT		\$25,000
		PROVISIONARY ALLOWANCE AMOUNT		\$100,000
TOTAL (This amount should equal the Base Bid amount on the Bid Summary Form)				\$

Base Bid (Sum of Bid Prices for all Base Bid Items):

_____ Dollars and No/Cents \$ _____
 (use words) (in figures)

Name of the Bidder _____ Agency No. _____ Funding Code _____ File No. _____

Date _____

SIGMA VENDOR NUMBER _____

Telephone No. _____

6.2 Schedule of Alternates - The Bidder will complete (or deduct from the Contract) the parts of the Work designated by the Alternates that follow and accept in full payment (or allow in full credit) for those parts of the Work the following Bid Prices:

Alternate Item No.	Bid Quantity	Description	Unit Price	Item Bid Price
1	1	Southern Gravel Parking lot (gravel parking lot and associated site work appx 64,922 sf). Fence surrounding southern gravel parking lot and (2) vehicle gates. (Appx 918 LF of 8'-0" high chain link barbed wire fence). Associated site lighting and circuiting.		
2	1	North Asphalt parking lot (Asphalt parking lot and associated site work appx. 29,885 sf). Associated site lighting and circuiting.		

The Bidder further acknowledges and agrees that the separate prices bid on this "Schedule of Alternates," where they are applicable and deemed acceptable by the **Owner**, will be used if incorporated into the Contract when the **Owner** issues the Notice of Award.

Name of the Bidder _____ Agency No. _____

Funding Code _____ File No. _____

Date _____

SIGMA VENDOR NUMBER _____

Telephone No. _____

ARTICLE 8 BID SUBMITTED ON the _____ day of _____, 20_____.

8.1. Bid Security is in the form of a Bid Bond _____ Bid Bond form provided in Section 00310 has been duly executed _____; or
A Certified or Cashier's check ___ or Money Order ___ if a check or money order is provided as Bid Security, the original check/money order must be delivered before Bid Due Time to the issuing office as per Section 00100 paragraph 5.2 and Section 00110 item 3.

8.2. If the Bidder is an Individual:

Name of Individual: _____
Name & Title of Person Authorized to sign: _____
Signature: _____ (If not the Individual, Attach Power of Attorney) Date _____
Doing Business as: _____
Business Address: _____
SIGMA VENDOR NUMBER _____
County of registration _____
Telephone: _____ FAX: _____

8.3. If the Bidder is a Partnership:

By: _____ (True Name of the Partnership)
Partner Authorized to Sign _____ Date _____
Signature: _____ (Attach evidence of Authority to sign) Date _____
Business Address: _____
SIGMA VENDOR NUMBER _____
County of registration _____
Telephone: _____ FAX _____

8.4. If the Bidder is a Corporation:

By: _____ (Legal Corporation Name)
Name & Title of Authorized Officer: _____
Signature: _____ (Attach evidence of Authority to sign) Date _____
Name & Title of Officer Attesting: _____
Signature: _____ Date _____
Business Address: _____
SIGMA VENDOR NUMBER _____
Telephone: _____ FAX _____
(State of Incorporation): _____

8.5. If The Bidder is A Joint Venture: JOINT VENTURE SIGNATURES SHALL BE AS PROVIDED IN PARAGRAPH 9.5 OF SECTION 00100 INSTRUCTIONS TO BIDDERS. EACH JOINT VENTURER SIGNING THE BID SHALL SIGN IN THE MANNER INDICATED FOR AN INDIVIDUAL, A PARTNERSHIP OR A CORPORATION. IF MORE THAN TWO JOINT VENTURERS OF THE SAME TYPE ARE INCLUDED, USE ADDITIONAL PAGES. JOINT VENTURE STATE OF INCORPORATION _____ OR COUNTY OF REGISTRATION _____

CERTIFICATE OF PRINCIPAL

(BIDDER)

I, _____, certify that I am the Secretary of the Corporation _____, or a General Partner _____ or Managing Partner _____ or Partner _____ of the partnership, named as the Bidder in the attached Section 00300 Bid Form; that _____ who signed Section 00300 Bid Form on behalf of the Bidder, was then _____ of that corporation _____ or partnership _____; that I know the undersigned's signature, and the signature is genuine; and that Section 00300 Bid Form was duly signed, sealed and attested for and on behalf of that corporation _____ partnership _____ by authority of its governing body _____ or partners _____

Signed by the Secretary or Other Authorized Officer of the Corporation _____ Date _____
or By General Partner or Managing Partner or Authorized Partner Certifying

Name of the Corporation or True Name of the Partnership

Federal Identification (I.D.) No. or Social Security No. (LAST 4 ONLY)

Telephone No.

(Corporate Seal)

VERIFICATION
(BIDDER)

STATE OF MICHIGAN)
)
COUNTY OF _____)

Before me, a Notary duly commissioned, qualified and acting, personally appeared (enter name of person who signed the Bid Form on behalf of the Bidder), _____ to me well known to be the person described in and who signed Section 00300 Bid Form, who being by me first duly sworn upon oath, says that he/she is the Attorney-in-Fact for (enter the Bidder's name) _____ and that he/she has been authorized by (enter name of individual, partnership name, or that governing body of the Bidder named in the attached corporate resolution) _____ to execute the attached Section 00300 Bid Form on behalf of the named Bidder in favor of the STATE OF MICHIGAN.

Subscribed and sworn before me this _____ day of _____, 20____.

Notary Public, State of: _____

My Commission Expires: _____

END OF SECTION 00300

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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.
- B. Provisions of Division 20 Section "Mechanical General Requirements" apply to this Section.
- C. Related Sections include the following:
 - 1. Division 10 Section "Fire-Protection Specialties" for cabinets and fire extinguishers.
 - 2. Division 20 Section "Basic Mechanical Materials and Methods."
 - 3. Division 20 Section "Hangers and Supports."
 - 4. Division 28 Section "Fire Alarm" for alarm devices not specified in this Section.

1.2 DEFINITIONS

- A. CR: Chlorosulfonated polyethylene synthetic rubber.
- B. High-Pressure Piping System: Fire-suppression piping system designed to operate at working pressure higher than standard 175 psig.
- C. PE: Polyethylene plastic.
- D. Underground Service-Entrance Piping: Underground service piping below the building.
- E. Hose Connection: Valve with threaded outlet matching fire hose coupling thread for attaching fire hose.
- F. Hose Station: Hose connection, fire hose rack, and fire hose.
- G. Working Plans: Documents, including drawings, calculations, and material specifications prepared according to NFPA 13 and NFPA 14 for obtaining approval from authorities having jurisdiction.

1.3 SYSTEM DESCRIPTIONS

- A. Wet-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing water and that is connected to water supply. Water discharges immediately from sprinklers when they are opened. Sprinklers open when heat melts fusible link or destroys frangible device. Hose connections are included if indicated.

1.4 PERFORMANCE REQUIREMENTS

- A. Standard Piping System Component Working Pressure: Listed for at least 175 psig.

- B. High-Pressure Piping System Component Working Pressure: Listed for 300 psig.
- C. Delegated Design: Design sprinkler system(s), including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- D. Fire-suppression sprinkler system design shall be approved by authorities having jurisdiction.
 - 1. Margin of Safety for Available Water Flow and Pressure: 10 percent, including losses through water-service piping, valves, and backflow preventers.
 - 2. Sprinkler Occupancy Hazard Classifications, for bidding purposes, as follows:
 - a. Automobile Parking Areas: Ordinary Hazard, Group 1.
 - b. Building Service Areas: Ordinary Hazard, Group 1.
 - c. Churches: Light Hazard.
 - d. Electrical Equipment Rooms: Ordinary Hazard, Group 1.
 - e. Dry-Cleaners: Ordinary Hazard, Group 2.
 - f. General Storage Areas: Ordinary Hazard, Group 1.
 - g. Laundries: Ordinary Hazard, Group 1.
 - h. Libraries, Except Stack Areas: Light Hazard.
 - i. Library Stack Areas: Ordinary Hazard, Group 2.
 - j. Machine Shops: Ordinary Hazard, Group 2.
 - k. Mechanical Equipment Rooms: Ordinary Hazard, Group 1.
 - l. Office and Public Areas: Light Hazard.
 - m. Plastics Processing Areas: Extra Hazard, Group 2.
 - n. Printing Plants: Extra Hazard, Group 1.
 - o. Repair Garages: Ordinary Hazard, Group 2.
 - p. Residential Living Areas: Light Hazard.
 - q. Restaurant Service Areas: Ordinary Hazard, Group 1.
 - r. Solvent Cleaning Areas: Extra Hazard, Group 2.
 - s. Upholstering Plants: Extra Hazard, Group 1.
 - 3. Minimum Density for Automatic-Sprinkler Piping Design:
 - a. Light-Hazard Occupancy: 0.10 gpm/sq. ft. over 1500-sq. ft. area.
 - b. Ordinary-Hazard, Group 1 Occupancy: 0.15 gpm over 1500-sq. ft. area.
 - c. Ordinary-Hazard, Group 2 Occupancy: 0.20 gpm/sq. ft. over 1500-sq. ft. area.
 - d. Extra-Hazard, Group 1 Occupancy: 0.30 gpm/sq. ft. over 2500-sq. ft. area.
 - e. Extra-Hazard, Group 2 Occupancy: 0.40 gpm/sq. ft. over 2500-sq. ft. area.
 - f. Special Occupancy Hazard: As determined by authorities having jurisdiction.
 - 4. Maximum Protection Area per Sprinkler:
 - a. Office Spaces: 120 sq. ft.
 - b. Storage Areas: 130 sq. ft.
 - c. Mechanical Equipment Rooms: 130 sq. ft.
 - d. Electrical Equipment Rooms: 130 sq. ft.
 - e. Other Areas: According to NFPA 13 recommendations, unless otherwise indicated.

5. Total Combined Hose-Stream Demand Requirement: According to NFPA 13, unless otherwise indicated:
 - a. Light-Hazard Occupancies: 100 gpm for 30 minutes.
 - b. Ordinary-Hazard Occupancies: 250 gpm for 60 to 90 minutes.
 - c. Extra-Hazard Occupancies: 500 gpm for 90 to 120 minutes.

E. Water velocity in the piping system shall not exceed the following:

1. Underground mains: 16 ft./sec.
2. Aboveground mains: 32 ft./sec.
3. Sprinkler branch lines: 24 ft./sec.

1.5 ACTION SUBMITTALS

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

1.6 INFORMATIONAL SUBMITTALS

A. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Wiring Diagrams: For power, signal, and control wiring.

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

C. Coordination Drawings: Sprinkler systems, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Domestic water piping.
2. HVAC hydronic piping.
3. Items penetrating finished ceiling include the following:

- a. Lighting fixtures.
- b. Air outlets and inlets.

D. Qualification Data: For qualified Installer.

E. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction, including hydraulic calculations, if applicable.

1. Sprinklers shall be referred to on drawings, submittals, and other documentation, by the sprinkler identification number (SIN) or model number as specifically published in the appropriate agency listing or approval. Trade names or other abbreviated designations shall not be allowed.

- F. Fire-hydrant flow test report.

1.7 CLOSEOUT SUBMITTALS

- A. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13. Include "Contractor's Material and Test Certificate for Aboveground Piping"
- B. Field quality-control reports.
- C. Operation and Maintenance Data: For sprinkler specialties to include in operation and maintenance manuals.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Installer's responsibilities include designing, fabricating, and installing fire-suppression systems and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test.
 - a. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a qualified professional engineer.
 - B. The provisions and requirements of the NFPA and constitute mandatory minimum requirements for the work of this Section.
 - C. NFPA Standards: Fire-suppression-system equipment, specialties, accessories, installation, and testing shall comply with the following:
 - 1. NFPA 13, "Installation of Sprinkler Systems."
 - D. Grooved couplings, fittings, valves, and specialties shall be the products of a single manufacturer.

1.9 COORDINATION

- A. Coordinate layout and installation of sprinklers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, and partition assemblies.
- B. Coordinate with ceiling installer to ensure proper grid type and installation for use with flexible sprinkler drops.

1.10 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Sprinkler Cabinets: Finished, wall-mounting, steel cabinet with hinged cover, with space for minimum of six spare sprinklers plus sprinkler wrench. Include number of sprinklers required by NFPA 13 and sprinkler wrench. Include separate cabinet with sprinklers and wrench for each type of sprinkler on Project.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 DUCTILE-IRON PIPE AND FITTINGS

- A. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, pressure class 350, with mechanical-joint bell end and plain end.
 - 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 gland, rubber gasket, and steel bolts and nuts.
- B. Push-on-Joint, Ductile-Iron Pipe: AWWA C151, pressure class 350, with push-on-joint bell end and plain end.
 - 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.

2.3 STANDARD-WEIGHT BLACK STEEL PIPE AND FITTINGS

- A. Threaded-End, Standard-Weight Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795, with factory- or field-formed threaded ends, and with factory applied antimicrobial coating on inner wall of pipe.
 - 1. Cast-Iron Threaded Flanges: ASME B16.1.
 - 2. Malleable-Iron Threaded Fittings: ASME B16.3.
 - 3. Gray-Iron Threaded Fittings: ASME B16.4.

4. Steel Threaded Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106, Schedule 40, seamless steel pipe. Include ends matching joining method.
 5. Steel Threaded Couplings: ASTM A 865.
- B. Plain-End, Standard-Weight Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795, and with factory applied antimicrobial coating on inner wall of pipe.
1. Steel Welding Fittings: ASTM A 234/A 234M, and ASME B16.9 or ASME B16.11.
 2. Steel Flanges and Flanged Fittings: ASME B16.5.
- C. Grooved-End, Standard-Weight Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795, with factory- or field-formed, square-cut- or roll- grooved ends, and with factory applied antimicrobial coating on inner wall of pipe.
1. Grooved-Joint Piping Systems:
 - a. Manufacturers:
 - 1) Anvil; Model 7401; ASC Engineered Solutions.
 - 2) Tyco Fire Protection Products by Johnson Controls Company; Grinnell G-Fire.
 - 3) Victaulic Co. of America; Style 005H, 009N, or 107N.
 - b. Grooved-End Fittings: UL-listed, ASTM A 536, ductile-iron casting with OD matching steel-pipe OD.
 - c. Grooved-End-Pipe Couplings: UL 213 and AWWA C606, rigid pattern, unless otherwise indicated; gasketed fitting matching steel-pipe OD. Include ductile-iron housing with keys matching steel-pipe and fitting grooves, rubber gasket listed for use with housing, and steel bolts and nuts.

2.4 SCHEDULE 10 BLACK STEEL PIPE AND FITTINGS

- A. Plain-End, Schedule 10 Steel Pipe: ASTM A 135 or ASTM A 795, Schedule 10 in NPS 5 and smaller; and NFPA 13 specified wall thickness in NPS 6 to NPS 10, and with factory applied antimicrobial coating on inner wall of pipe.
1. Steel Welding Fittings: ASTM A 234/A 234M, and ASME B16.9 or ASME B16.11.
 2. Steel Flanges and Flanged Fittings: ASME B16.5.
- B. Grooved-End, Schedule 10 Steel Pipe: ASTM A 135 or ASTM A 795, Schedule 10 in NPS 5 and smaller; and NFPA 13-specified wall thickness in NPS 6 to NPS 10; with factory- or field-formed, roll-grooved ends, and with factory applied antimicrobial coating on inner wall of pipe.
1. Grooved-Joint Piping Systems:
 - a. Manufacturers:
 - 1) Anvil; Model 7401; ASC Engineered Solutions.

- 2) Tyco Fire Protection Products by Johnson Controls Company; Grinnell G-Fire.
 - 3) Victaulic Co. of America; Style 005H, 009N, or !07N.
- b. Grooved-End Fittings: UL-listed, ASTM A 536, ductile-iron casting with OD matching steel-pipe OD.
 - c. Grooved-End-Pipe Couplings: UL 213 and AWWA C606, rigid pattern, unless otherwise indicated; gasketed fitting matching steel-pipe OD. Include ductile-iron housing with keys matching steel-pipe and fitting grooves, rubber gasket listed for use with housing, and steel bolts and nuts.

2.5 COVER SYSTEM FOR SPRINKLER PIPING

- A. Manufacturers:
 1. DecoShield Systems, Inc.
- B. Description: System of support brackets and covers made to protect sprinkler piping.
- C. Brackets: Glass-reinforced nylon.
- D. ~~Covers: Extruded PVC sections of length, shape, and size required for size and routing of CPVC piping.~~

2.6 FLEXIBLE CONNECTORS

- A. Flexible connectors shall have materials suitable for system fluid. with 175-psig minimum working-pressure rating. Flexible connectors shall have 300-psig working-pressure rating if fittings are components of high-pressure piping system.
 1. NPS 2 and Smaller: Threaded.
 2. NPS 2-1/2 and Larger: Flanged.
 3. Option for NPS 2-1/2 and Larger: Grooved for use with grooved-end-pipe couplings.
- B. Manufacturers:
 1. Anamet Inc.
 2. Flex-Hose Co., Inc.
 3. Flexicraft Industries.
 4. Hyspan Precision Products, Inc.
 5. Metraflex, Inc.
- C. Stainless-Steel-Hose/Steel Pipe, Flexible Connectors: Corrugated, stainless-steel, inner tubing covered with stainless-steel wire braid. Include steel nipples or flanges, welded to hose.

- D. Stainless-Steel-Hose/Stainless-Steel Pipe, Flexible Connectors: Corrugated, stainless-steel, inner tubing covered with stainless-steel wire braid. Include stainless-steel nipples or flanges, welded to hose.

2.7 SPRINKLER SPECIALTY FITTINGS

- A. Sprinkler specialty fittings shall be UL listed or FMG approved, with 175-psig minimum working-pressure rating, and made of materials compatible with piping. Sprinkler specialty fittings shall have 300-psig working-pressure rating if fittings are components of high-pressure piping system.
- B. Sprinkler Drain and Alarm Test Fittings: Cast-bronze or ductile-iron body; with threaded or locking-lug inlet and outlet, test valve, and orifice and sight glass.
 - 1. Manufacturers:
 - a. Tyco Fire Protection Products by Johnson Controls Company.
 - b. Fire-End and Croker Corp.
 - c. Viking Corp.
 - d. Victaulic Co. of America; Style 720 TestMaster II.
- C. Sprinkler Branch-Line Test Fittings: Brass body with threaded inlet, capped drain outlet, and threaded outlet for sprinkler.
 - 1. Manufacturers:
 - a. Elkhart Brass Mfg. Co., Inc.
- D. Sprinkler Inspector's Test Fitting: Cast- or ductile-iron housing with threaded inlet and drain outlet and sight glass.
 - 1. Manufacturers:
 - a. AGF Manufacturing Co.
 - b. G/J Innovations, Inc.
 - c. Triple R Specialty of Ajax, Inc.
 - d. Tyco Fire Protection Products by Johnson Controls Company.
- E. Drop-Nipple Fittings: UL 1474, adjustable with threaded inlet and outlet, and seals.
 - 1. Manufacturers:
 - a. CECA, LLC.
 - b. Merit.
- F. Flexible Sprinkler Drop Fittings:
 - 1. Manufacturers:

- a. Victaulic Co. of America; VicFlex Sprinkler Fittings; AH-2 or AH2-CC with AB1 Bracket Assembly.
 - b. Reliable Automatic Sprinkler Co., Inc.; RASCOflex Series RFB.
 - c. FlexHead Industries, Inc.; ASC Engineered Solutions
2. Description: UL listed and FMG approved stainless steel flexible hose for connection to sprinkler, and with bracket for connection to commercial ceiling grid.
 3. Standard: UL 2443.
 4. Pressure Rating: 175 psig minimum; 300 psig if fittings are components of high-pressure piping system.
 5. Size: Same as connected piping, for sprinkler.
- G. Dry-Pipe-System Fittings: UL listed for dry-pipe service.

2.8 LISTED FIRE-PROTECTION VALVES

- A. Valves: UL listed or FMG approved.
1. Valves shall have 175-psig minimum pressure rating.
- B. Gate Valves with Wall Indicator Posts:
1. Gate Valves: UL 262, cast-iron body, bronze mounted, with solid disc, nonrising stem, operating nut, and flanged ends.
 2. Indicator Posts: UL 789, horizontal-wall type, cast-iron body, with extension rod, locking device, and cast-iron barrel.
 3. Manufacturers:
 - a. McWane, Inc.; Kennedy Valve Div.
 - b. NIBCO.
 - c. Crane Co.; Crane Valve Group; Stockham Valves.
- C. Ball Valves: Comply with UL 1091, except with ball instead of disc.
1. NPS 1-1/2 and Smaller: Bronze body with threaded ends.
 2. NPS 2 and NPS 2-1/2: Bronze body with threaded ends or ductile-iron body with grooved ends.
 3. NPS 3: Ductile-iron body with grooved ends.
 4. Manufacturers:
 - a. NIBCO.
 - b. Victaulic Co. of America.
- D. Butterfly Valves: UL 1091.
1. NPS 2-1/2 and Larger: Bronze, cast-iron, or ductile-iron body; wafer type or with flanged or grooved ends.
 - a. Manufacturers:

- 1) McWane, Inc.; Kennedy Valve Div.
 - 2) Mueller Company; ASC Engineered Solutions.
 - 3) NIBCO.
 - 4) Tyco Fire Protection Products by Johnson Controls Company.
 - 5) Victaulic Co. of America; Series 705.
- E. Check Valves NPS 2 and Larger: UL 312, swing type, cast-iron body with flanged or grooved ends.
1. Manufacturers:
 - a. Crane Co.; Crane Valve Group; Crane Valves.
 - b. Crane Co.; Crane Valve Group; Jenkins Valves.
 - c. Crane Co.; Crane Valve Group; Stockham Valves.
 - d. Hammond Valve.
 - e. McWane, Inc.; Kennedy Valve Div.
 - f. Mueller Company; ASC Engineered Solutions.
 - g. NIBCO.
 - h. Tyco Fire Protection Products by Johnson Controls.
 - i. Victaulic Co. of America.
 - j. Watts Water Technologies, Inc.; Watts Regulator Co.
- F. Gate Valves: UL 262, OS&Y type.
1. NPS 2 and Smaller: Bronze body with threaded ends.
 - a. Manufacturers:
 - 1) Crane Co.; Crane Valve Group; Crane Valves.
 - 2) Hammond Valve.
 - 3) NIBCO.
 2. NPS 2-1/2 and Larger: Cast or ductile -iron body with flanged or grooved ends.
 - a. Manufacturers:
 - 1) McWane, Inc.; Clow Valve Co.
 - 2) Crane Co.; Crane Valve Group; Crane Valves.
 - 3) Crane Co.; Crane Valve Group; Jenkins Valves.
 - 4) Hammond Valve.
 - 5) Milwaukee Valve Company.
 - 6) Mueller Company.
 - 7) NIBCO.
 - 8) Victaulic Co. of America: Series 771.
- G. Indicating Valves: UL 1091, with integral indicating device and ends matching connecting piping.
1. Indicator: Electrical, 115-V ac, prewired, single-circuit, supervisory switch.
 2. NPS 2 and Smaller: Ball or butterfly valve with brass or bronze body and threaded ends.

- a. Manufacturers:
 - 1) Milwaukee Valve Company.
 - 2) NIBCO.
 - 3) Victaulic Co. of America; Series 728.
- 3. NPS 2-1/2 and Larger: Butterfly valve with cast- or ductile-iron body; wafer type or with flanged or grooved ends.
 - a. Manufacturers:
 - 1) Tyco Fire Protection Products by Johnson Controls.
 - 2) McWane, Inc.; Kennedy Valve Div.
 - 3) Milwaukee Valve Company.
 - 4) NIBCO.
 - 5) Victaulic Co. of America.

2.9 AUTOMATIC (BALL DRIP) DRAIN VALVES

A. General:

- 1. Standard: UL 1726.
- 2. Pressure Rating: 175 psig minimum.
- 3. Type: Automatic draining, ball check.
- 4. Size: NPS 3/4.
- 5. End Connections: Threaded.

B. Manufacturer:

- 1. Reliable Automatic Sprinkler Co., Inc.
- 2. Tyco Fire Protection Products by Johnson Controls Company.

2.10 SPRINKLERS

- A. Sprinklers shall be UL listed or FMG approved, with 175-psig minimum pressure rating. Sprinklers shall have 300-psig pressure rating if sprinklers are components of high-pressure piping system.

B. Manufacturers:

- 1. Reliable Automatic Sprinkler Co., Inc.
- 2. Tyco Fire Protection Products by Johnson Controls Company.
- 3. Victaulic Co. of America.
- 4. Viking Corp.

C. Automatic Sprinklers:

- 1. With heat-responsive glass bulb element complying with the following:

- a. UL 199, for nonresidential applications.
 - b. UL 1626, for residential applications.
 - c. UL 1767, for early-suppression, fast-response applications.

 - d. Orifice: 1/2 inch, with discharge coefficient K between 5.3 and 5.8.
 - e. Orifice: 17/32 inch, with discharge coefficient K between 7.4 and 8.2.
- D. Sprinkler Types and Categories: Nominal 1/2-inch orifice for 165 deg F "Ordinary" 212 deg F "Intermediate" temperature classification rating, unless otherwise indicated or required by application.
- E. Sprinkler types, features, and options as follows:
1. Concealed ceiling sprinklers, including cover plate.
 2. Extended-coverage sprinklers.
 3. Flush ceiling sprinklers, including escutcheon.
 4. High-pressure sprinklers.
 5. Institution sprinklers, made with a small, breakaway projection.
 6. Open sprinklers.
 7. Pendent sprinklers.
 8. Pendent, dry-type sprinklers.
 9. Quick-response sprinklers.
 10. Recessed sprinklers, including escutcheon.
 11. Sidewall sprinklers.
 12. Sidewall, dry-type sprinklers.
 13. Concealed sidewall sprinklers, including cover plate.
 14. Upright sprinklers.
- F. Sprinkler Finishes: Chrome plated, bronze, and painted.
- G. Special Coatings: Wax, lead, and corrosion-resistant paint.
- H. Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers. Escutcheons listed, supplied, and approved for use with the sprinkler by the sprinkler manufacturer.
1. Ceiling Mounting: Chrome-plated steel, 2 piece, with 3/4-inch vertical adjustment.
 2. Sidewall Mounting: Chrome-plated steel, one piece, flat.
- I. Sprinkler Guards: Wire-cage type, including fastening device for attaching to sprinkler. Sprinkler guards listed, supplied, and approved for use with the sprinkler by the sprinkler manufacturer.
- 2.11 PRESSURE GAGES
- A. Manufacturers:
1. AMETEK, Inc.; U.S. Gauge.
 2. Ashcroft Inc.

3. Marsh Bellofram.
4. Viking Corp.
5. Weiss Instruments, Inc.

B. Description: UL 393, 3-1/2- to 4-1/2-inch- diameter, dial pressure gage with range of 0 to 250 psig minimum.

1. Water System Piping: Include caption "WATER" or "AIR/WATER" on dial face.
2. Air System Piping: Include caption "AIR" or "AIR/WATER" on dial face.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Perform fire-hydrant flow test according to NFPA 13 and NFPA 291. Use results for system design calculations required in Part 1 "Quality Assurance" Article.
- B. Report test results promptly and in writing.

3.2 EXAMINATION

- A. Examine roughing-in for hose connections and stations to verify actual locations of piping connections before installation.
- B. Examine walls and partitions for suitable thicknesses, fire- and smoke-rated construction, framing for hose-station cabinets, and other conditions where hose connections and stations are to be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 PIPING APPLICATIONS, GENERAL

- A. Flanges, flanged fittings, unions, nipples, grooved-joint couplings, and transition and special fittings with finish and pressure ratings same as or higher than system's pressure rating may be used in aboveground applications, unless otherwise indicated.

3.4 SPRINKLER SYSTEM PIPING APPLICATIONS

- A. Wet-Pipe Sprinklers: Use the following:

<u>Pipe Type</u>	<u>1 1/2" & Smaller</u>	<u>2"</u>	<u>2 1/2" - 3 1/2"</u>	<u>4"</u>	<u>5" - 6"</u>
Standard weight steel, threaded fittings	YES	YES	YES	YES	NO
Standard weight steel, grooved fittings	NO	NO	YES	YES	YES

<u>Pipe Type</u>	<u>1 1/2" & Smaller</u>	<u>2"</u>	<u>2 1/2" - 3 1/2"</u>	<u>4"</u>	<u>5" - 6"</u>
Standard weight steel, welded fittings	NO	YES	YES	YES	YES
Galv. standard weight steel, threaded fittings	YES	YES	YES	YES	YES
Galv. standard weight steel, grooved fittings	NO	NO	YES	YES	YES
Schedule 10 steel, welded fittings	NO	YES	YES	YES	YES
Schedule 10 steel, grooved fittings	NO	NO	YES	YES	YES
Type K copper, brazed fittings	NO	NO	NO	NO	NO
Type L copper, brazed fittings	NO	NO	NO	NO	NO
Type K copper, brazed fittings	NO	NO	NO	NO	NO
Type L copper, grooved fittings	NO	NO	NO	NO	NO
CPVC pipe, solvent cement fittings	NO	NO	NO	NO	NO

3.5 VALVE APPLICATIONS

A. The following requirements apply:

1. Listed Fire-Protection Valves: UL listed or FMG approved for applications where required by NFPA 13 .
 - a. Shutoff Duty: Use ball, butterfly, or gate valves.
2. Unlisted General-Duty Valves: For applications where UL-listed and FMG-approved valves are not required by NFPA 13.
 - a. Shutoff Duty: Use ball, butterfly, or gate valves.
 - b. Throttling Duty: Use ball or globe valves.

3.6 JOINT CONSTRUCTION

- A. Refer to Division 20 Section "Basic Mechanical Materials and Methods" for basic piping joint construction.
- B. Threaded Joints: Comply with NFPA 13 for pipe thickness and threads. Do not thread pipe smaller than NPS 8 with wall thickness less than Schedule 40 unless approved by authorities having jurisdiction and threads are checked by a ring gage and comply with ASME B1.20.1.
- C. Welded Joints: Construct joints according to AWS D10.12M/D10.12, using qualified processes and welding operators according to "Quality Assurance" Article.

1. Shop weld pipe joints where welded piping is indicated. Do not use welded joints for galvanized-steel pipe.
- D. Use of saddle style tees is not acceptable.
- E. Grooved Joints: Assemble joints with listed coupling and gasket, lubricant, and bolts.
 1. All grooved couplings, fittings, gaskets, valves, and specialties shall be the product of a single manufacturer.
 2. Steel Pipe: Square-cut or roll-groove piping as indicated. Use grooved-end fittings and rigid, grooved-end-pipe couplings, unless otherwise indicated.
- F. Dissimilar-Metal Piping Joints: Construct joints using dielectric fittings compatible with both piping materials. Refer to Division 20 Section "Basic Mechanical Materials and Methods" for additional requirements.

3.7 PIPING INSTALLATION

- A. Refer to Division 20 Section "Basic Mechanical Materials and Methods" for basic piping installation.
- B. Use approved fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.
- C. Install unions adjacent to each valve in pipes NPS 2 and smaller. Unions are not required on flanged devices or in piping installations using grooved joints.
- D. Install flanges or flange adapters on valves, apparatus, and equipment having NPS 2-1/2 and larger connections.
- E. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, sized and located according to NFPA 13.
- F. Install sprinkler piping with drains for complete system drainage.
- G. Install sprinkler zone control valves, test assemblies, and drain risers adjacent to standpipes when sprinkler piping is connected to standpipes.
- H. Install drain valves on standpipes.
- I. Install ball drip valves to drain piping between fire department connections and check valves. Drain to floor drain or outside building.
- J. Install alarm devices in piping systems.
- K. Hangers and Supports: Comply with NFPA 13 for hanger materials.
 1. Install standpipe system piping according to NFPA 14.

2. Install sprinkler system piping according to NFPA 13, except use of "C" clamps, or beam clamps of "C" pattern, or any modification thereof, is prohibited for supporting pipes larger than NPS 2-1/2.
 3. Refer to Division 20 Section "Hangers and Supports" for additional requirements.
- L. Install pressure gages on riser or feed main, at each sprinkler test connection, and at top of each standpipe. Include pressure gages with connection not less than NPS 1/4 and with soft metal seated globe valve, arranged for draining pipe between gage and valve. Install gages to permit removal, and install where they will not be subject to freezing.
- M. Drain dry-type standpipe piping.
- N. Fill wet-pipe sprinkler system piping with water.

3.8 INSTALLATION OF COVER SYSTEM FOR SPRINKLER PIPING

- A. Install cover system, brackets, and cover components for sprinkler piping according to manufacturer's "Installation Manual" and with NFPA 13 or NFPA 13R for supports.

3.9 VALVE INSTALLATION

- A. Install listed fire-protection valves, unlisted general-duty valves, specialty valves and trim, controls, and specialties according to NFPA 13 and authorities having jurisdiction.
- B. Install listed fire-protection shutoff valves supervised-open, located to control sources of water supply except from fire department connections. Install permanent identification signs indicating portion of system controlled by each valve.
- C. Valves for Wall-Type Fire Hydrants: Install nonrising-stem gate valve in water-supply pipe.
- D. Install check valve in each water-supply connection. Install backflow preventers instead of check valves in potable-water supply sources.
- E. Specialty Valves:
1. Alarm Check Valves: Install in vertical position for proper direction of flow, including bypass check valve and retarding chamber drain-line connection.

3.10 SPRINKLER APPLICATIONS

- A. Use the following sprinkler types:
1. Rooms without Ceilings: Upright sprinklers.
 2. Rooms with Suspended Ceilings: Concealed sprinklers.
 3. Wall Mounting: Sidewall sprinklers.
 4. Sprinkler Finishes:

- a. Upright, Pendent, and Sidewall Sprinklers: Chrome plated in finished spaces exposed to view; rough bronze in unfinished spaces not exposed to view; wax coated where exposed to acids, chemicals, or other corrosive fumes; white polyester finish in natatoriums.
 - b. Concealed Sprinklers: Rough brass, with factory-painted white cover plate.
 - c. Flush Sprinklers: Bright chrome, with painted white escutcheon.
 - d. Recessed Sprinklers: Bright chrome, with bright chrome escutcheon.
5. Sprinkler Guards: For exposed sprinkler heads subject to damage.

3.11 SPRINKLER INSTALLATION

- A. Install sprinklers in suspended ceilings in center of acoustical ceiling panels and tiles.
- B. Install sprinklers into flexible sprinkler drop fittings and install into bracket on ceiling grid. Install according to manufacturer's instructions and NFPA, State, and local guidelines. Ceiling grid must meet requirements of ASTM C 635 and C 636, coordinate with ceiling installer.

3.12 CONNECTIONS

- A. Install piping adjacent to equipment to allow service and maintenance.
- B. Connect water-supply piping to fire-suppression piping. Include backflow preventer between potable-water piping and fire-suppression piping. Refer to Division 22 Section "Domestic Water Piping Specialties" for backflow preventers.
- C. Install ball drip valves at each check valve for fire department connection. Drain to floor drain or outside building.
- D. Connect piping to specialty valves, hose valves, specialties, fire department connections, and accessories.
- E. Connect compressed-air supply to dry-pipe sprinkler piping.
- F. Connect air compressor to the following piping and wiring:
 1. Pressure gages and controls.
 2. Electrical power system.
 3. Fire alarm devices, including low-pressure alarm.
- G. Electrical Connections: Power wiring and fire alarm wiring are specified in Division 26.
- H. Connect alarm devices to fire alarm.
- I. Ground equipment according to Division 26 Section "Grounding and Bonding."
- J. Connect wiring according to Division 26 Section "Conductors and Cables."

- K. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.13 LABELING AND IDENTIFICATION

- A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13 and in Division 20 Section "Mechanical Identification."

3.14 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:
 - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - 3. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.
 - 4. Flush, test, and inspect standpipe systems according to NFPA 14, "System Acceptance" Chapter.
 - 5. Verify that equipment hose threads are same as local fire department equipment.
 - 6. Test each backflow prevention device according to authorities having jurisdiction and the device's reference standard.
- B. Verify that specialty valves, trim, fittings, controls, and accessories are installed and operate correctly.
- C. Verify that air compressors and their accessories are installed and operate correctly.
- D. Verify that specified tests of piping are complete.
- E. Verify that damaged sprinklers and sprinklers with paint or coating not specified are replaced with new, correct type.
- F. Verify that sprinklers are correct types, have correct finishes and temperature ratings, and have guards as required for each application.
- G. Verify that potable-water supplies have correct types of backflow preventers.
- H. Pressurize and check dry-pipe sprinkler piping air-pressure maintenance devices and air compressors.
- I. Verify that hose connections are correct type and size.
- J. Verify that hose stations are correct type and size.
- K. Energize circuits to electrical equipment and devices.

- L. Start and run air compressors.
- M. Adjust operating controls and pressure settings.
- N. Coordinate with fire alarm tests. Operate as required.
- O. Report test results promptly and in writing to Architect and authorities having jurisdiction.

3.15 CLEANING AND PROTECTION

- A. Clean dirt and debris from sprinklers.
- B. Remove and replace sprinklers with paint other than factory finish.
- C. Protect sprinklers from damage until Substantial Completion.

3.16 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain specialty valves.

END OF SECTION 21 11 00