CITY OF GALESBURG

PURCHASING
55 West Tompkins Street
Galesburg, IL 61401
Phone: 309/345-3678

INVITATION FOR BIDS

For Improvements to Park Plaza and Parking Lot E
for the City of Galesburg, Illinois

Instructions to Bidders

1. An advertisement for sealed bids on the above was published in the Galesburg Register-Mail on October 27, 2018. As stated in such notice, bids will be received until 11:00 a.m., local time, November 21, 2018, and, at that time, publicly opened and read aloud in the Basement Conference Room, located in City Hall. Bids received after 11:00 a.m. will be rejected.

2. The person, firm or corporation making a bid shall submit it in a sealed envelope to the Purchasing Agent or his duly designated representative on or before the hour and the day stated above. The notation "Bid on Improvements to Park Plaza and Parking Lot E" shall appear on the outside of the sealed envelope and shall include the name of the bidder. Bidder shall also clearly mark on the outside of the envelope: company name and address.

3. The bidder shall insert the cost, and supply all the information, as indicated on the Bid Form. The cost inserted shall be net and shall be the full cost for the work specified, including all factors whatsoever. No permits shall be waived or paid for by the City of Galesburg.

4. No charge will be allowed for taxes from which the City of Galesburg is exempt: the Illinois Retailer's Occupation Tax, the Service Occupation Tax, the Service Use Tax, the Use Tax, Federal Excise and Transportation Tax.

5. Each bidder shall affirm that no official or employee of the City of Galesburg is directly or indirectly interested in this bid for any reason of personal gain.

6. Contractors and any sub-contractors will be required to comply with all applicable provisions of the Davis-Bacon Act, as amended to date, including those affecting labor standards and prevailing wage rates and those prohibiting discrimination on the grounds of race, color, national origin and sex.

7. All bids shall be accompanied by a Bid Bond, Bank Cashier's Check, Certified Check or Bank Draft, payable to the City Treasurer of Galesburg for not less than five (5%) percent of the amount of each bid.

8. The successful bidder at the time of execution of the contract SHALL NOT be required to deposit a contractor bond for the full amount of the award. When a contract bond is not required, the proposal guarantee check will be held in lieu thereof. If this proposal is accepted and the undersigned fails to execute a contract (required) and contract bond (if required), it is hereby agreed that the Bid Bond or check shall be forfeited to the Awarding Authority. The successful bidder shall be required to enter into a Performance Bond in a sum equal to the amount of his bid, and a Labor and Material Payment Bond.

9. Should the successful bidder fail to submit the required bonds, or enter into a contract with the City within fifteen (15) days after notification of award, said bidder will forfeit his check or bond to the City, not as a penalty, but as liquidated damages.

10. Insurance coverage shall be carried by the successful bidder per the attached Special Provisions sheet for Contractor's Insurance.

11. TERMINATION FOR BREACH: In the event that any of the provisions of the contract are violated by the Contractor or by any of his Subcontractors, the Owner may serve written notice upon the Contractor and the Surety of the intention to terminate such contract, such notice to contain the reasons for such termination intention, and unless within ten (10) days after serving of such notice upon the Contractor such violations shall cease and satisfactory arrangements for correction be made, the contract shall, upon expiration of said ten (10) days, cease and terminate. In the event of any such termination the Owner shall immediately serve notice thereof upon the Surety and the Contractor, and the Surety shall have the right to take over and perform the Contract, provided however, that if the Surety does not commence performance thereof within thirty (30) days from the date of the mailing to such Surety notice of termination, the Owner may take over the work and prosecute the same to completion by Contract for the amount and at the expense of the Contractor, and the Contractor and his Surety shall be liable to the Owner for any excess cost occasioned by the Owner thereby.

12. No bid may be changed or withdrawn after the time of the bid opening. Any modifications or withdrawals requested before this time shall be acceptable only when such request is made in writing and agreed to by the Purchasing Agent.

13. The City of Galesburg reserves the right to reject any and all bids and to waive any informalities or technicalities in the bidding. Any bid submitted will be binding for (60) sixty days after the date of the bid opening.

14. Successful bidder to whom an award shall be made pursuant to this procurement shall be subject to all applicable Federal and State laws and regulations, including but not limited to the Illinois acts commonly knows as the Illinois Prevailing Wage Act (820 ILCS 130)

15. The submission of the proposal or bid by the Offeror in response to this Advertisement for Bid/Proposal constitutes an acknowledgement of and an agreement by the Offeror/Bidder that it understands and will comply with the Illinois Prevailing Wage Act and the Illinois Preference Act (30 ILCS 570). Certified payroll reports will be required for this work.

16. The City has adopted an "Equal Employment Opportunity Clause", which is incorporated into all specifications, purchase orders, and contracts, whereby a vendor agrees not to discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin or ancestry. A copy of this clause may be obtained at the City Clerk's Office, City Hall, Galesburg, Illinois.

17. The City of Galesburg has adopted an Affirmative Action Program. All formal sealed bids must be accompanied by a properly prepared Certificate of Compliance form, whereby the vendor certifies the number of employees he has in each class of employment, and that affirmative action has been taken to ensure equality of opportunity in all aspects of employment.

18. Bidder certifies that all laws of the State of Illinois and ordinances of the City of Galesburg in effect at the date of the bid shall be observed by him. Evidence of any violation during the term of the agreement shall be considered sufficient reason to discontinue purchases by the City from that vendor.

19. Public Act 95-0635 requires that before any contractor o subcontractor begins work on ANY public works project that requires prevailing wages, they must have a written Substance Abuse Prevention Program on file with the contracting agency (City); or have a collective bargaining agreement in effect dealing with the subject matter.

20. All general bidding information, bid forms, conditions of the contract, and the form of agreement, between the City and the Contractor, shall be approved by Purchasing prior to advertising of public notice of the project.

21. The successful bidder is prohibited from assigning, transferring, conveying, subletting, or otherwise disposing of the contract to be signed or its rights, title or interest therein or its power to execute such Agreement to any other person, company or corporation without the previous consent and approval, in writing, by the City of Galesburg.

22. Bid must show the number of days required to complete services under normal conditions. Bids should also indicate an estimated start date and completion date.

23. The City requires that vendors be paid through ACH (automatic clearing house). The awarded vendor will be required to provide the City with applicable banking information for proper payment. An ACH form is attached to this document for vendor review.

24. These instructions are to be considered an integral part of any bid.

Dated: October 27, 2018

Kraig Boynton

Digitally signed by Kraig Boynton
DN: cn=Kraig Boynton, o=City of Galesburg, ou=Purchasing - Finance, email=kboynton@ci.galesburg.il.us, c=US
Date: 2018.10.25 07:42:11 -05'00'

Kraig Boynton
Purchasing Agent

Park Plaza and Parking Lot E

City of Galesburg

BID FORM

Contractors must bid on the entire project and alternate(s). The bidder agrees to furnish all labor, materials, equipment, and incidentals to deliver a complete and finished project as required by the bidding document for the following stipulated sums.

Note:

Acceptance or rejection of the alternate bid item is subject to the Owner's discretion. The Owner reserves the right to award the contract based upon any combination of Base Bid and Alternate Bid Item(s).

PROJECT COMPONENTS

1. The project includes demolition of the park plaza amphitheater and removal of asphalt paving, concrete sidewalks and curbs/gutters, and misc. Improvements include a restroom building, concrete surfaces, colored concrete, dumpster enclosures, street patching, curbs and gutters, storm sewer, drainage improvements, and associated components. Features include site walls, water feature, parking lot lights, electrical wiring, light fixtures, and controls of various types. Project also includes site furnishings – flag poles, benches, planters, bollards, wayfinding sign, trash receptacles, relocated sculpture, irrigation, and plant material. Coordination with nearby building demolition project will be required.

2. Pay items are listed in a table format on the following sheets, and unit and extended prices shall be filled out by the bidder for each item listed. The total of all Base Bid and Alternate Items should be calculated and inserted in the appropriate boxes.

The undersigned bidder hereby declares that the only person or persons interested in the above proposal as principals are named herein and that no other person than herein mentioned has any interest in this proposal or in the contract be entered into; that this proposal is made without connection with any other person, company, or parties making a bid or proposal; and that it is in all respects fair and in good faith without collusion or fraud.

The undersigned bidder hereby certifies that it is not barred from bidding on any contract offered for bid by the State of Illinois or any unit of local government as a result of a conviction for violating Sections 33E-33 or 33E-4 of the Illinois Criminal Code.

The undersigned bidder hereby certifies that it is not delinquent in the payment of any tax administered by the Illinois Department of Revenue. If the undersigned bidder has entered into an agreement with the Department of Revenue for the payment of any taxes that are past due and is in compliance with that agreement, the bidder shall so state: _____

The undersigned, having familiarized himself/herself with condition affecting the cost of the work and its performance and having carefully examined and fully understands the entire project manual, plans, and all other pertinent contract documents and addenda, hereby proposes to furnish all labor, materials, equipment and services to satisfactorily perform this contract according to its terms for the above stated consideration.

The undersigned further certifies that he/she executed the Proposal with full authority to do so and that all statements contained in the proposal are true and correct and made with full knowledge that the Owner will rely upon the truth of the statements contained in this Proposal in awarding the contract.

Name of Business submitting this bid _____

Date _____

Name of person signing bid (type or print) _____

Signature _____

Title or Capacity _____

Business FEIN _____

Social Security Number if not incorporated _____

Subscribed and sworn to before me this

_____ day of _____, 2018.

Notary Public

Printed Name _____

Signature _____

My commission expires on (date) _____

Notary Seal below.

Park Plaza and Parking Lot E
City of Galesburg

BID FORM

1. The undersigned bidder submits with this bid form, all requested information.

2. The undersigned bidder states that he/she has been regularly engaged in work of the type required by the specifications herein for _____ years and respectfully invites your attention to the following comparable projects.

_____

_____

_____

_____

_____

3. The undersigned Bidder agrees that the bid shall include utilization of the following Subcontractors provided these Subcontractors are acceptable to the Owner.

_____

_____

_____

_____

_____

4. The undersigned Bidder acknowledges receipt of the following addenda.

_____

_____

_____

_____

_____

The following bid form may be withdrawn at any time prior to the scheduled time for the opening of bids or any authorized postponement thereof.

If written notice of the acceptance of this proposal is mailed or otherwise delivered to the undersigned within sixty (60) calendar days after the date of opening of the bids, or any time thereafter before this bid is withdrawn, the undersigned will, within ten (10) calendar days after the date of such mailing delivery of such notice, execute and deliver the Contract Execution Page provided in this booklet.

The undersigned bidder hereby designates as the office to which such notice of acceptance may be mailed or delivered as follows.

_____

(street address)_____

(city, state and zip code)

Name and telephone number of person to contact regarding this bid:

Name _____

Phone _____

Bidder shall certify the following, providing additional information as required.

The undersigned bidder hereby certifies that it and any Subcontractors who will be performing work under this public works project have not been found by the Illinois Department of Labor to be in violation of the Prevailing Wage Act within the two year period immediately preceding the date of the application for Assistance.

_____

Signature

The undersigned bidder hereby certifies that it and any Subcontractors who will be performing work under this public works project are participants in an applicable apprenticeship and training program or programs approved by and registered with the United States Department of Labor's Bureau of Apprenticeship and Training.

_____

Signature

If your organization is a corporation, limited liability company, limited liability partnership, or limited partnership, etc., you must provide a copy of your current certification of good standing from your State of incorporation with your bid. Failure to do so may result in the rejection of your bid.
NOTE: Attach certification if needed.

_____

Signature

Pursuant to Illinois law as it pertains to foreign corporations, foreign limited liability companies, foreign limited liability partnerships, or foreign limited partnerships, you may be required to register with the Illinois Secretary of State. A foreign entity is an entity organized or incorporated in a state other than Illinois. The undersigned bidder hereby certifies that it has examined the relevant statutes and determined that either: (1) It is not required to register as a foreign entity with the Illinois Secretary of State; or (2) It is required to register as a foreign entity with the Illinois Secretary of State, that is has so registered, and that proof of registration is attached hereto.
NOTE: Attach proof of registration if needed.

_____
Signature

The undersigned bidder hereby certifies that it and any Subcontractors who will be performing work under this public works project does not employ unauthorized aliens as defined in the Federal Immigration and Nationality Act (8 U.S.C. 1101, *et seq.*, Section 274A).

_____
Signature

Park Plaza and Parking Lot E

City of Galesburg

BID FORM

BASE BID					
Item #	**Item Description**	**Unit**	**Quantity**	**Unit Price**	**Extended Price**
Site Preparation					
1	Pavement Removal	sq. yd.	2828		
2	Concrete Curb Removal	linear ft.	1484		
3	Median/Sidewalk Removal	sq. ft.	1035		
4	Concrete Retaining Wall Removal	linear ft.	133		
5	Tree Removal	each	27		
6	Light Pole Removal	each	13		
7	Abandon Existing Storm Sewer Inlet	each	1		
8	Remove Civil Defense Siren	LS	1		
9	Remove Existing Fire Hydrant	each	1		
10	Remove Existing Storm Structure	each	6		
11	Abandon Existing Storm Sewer, 10"	linear ft.	57		
12	Abandon Existing Storm Sewer, 18"	linear ft.	157		
13	Sidewalk Removal	sq. ft.	5349		
14	Raised Stage Removal	sq. ft.	930		
15	Raised Landscaping Area Removal	sq. ft.	2730		
16	Concrete Retaining Wall Removal	linear ft.	70		
17	Depressed Area Backfill	cu. yd.	500		
18	Storm Sewer, 6"	linear ft.	42		
19	Storm Sewer, 6" Perforated	linear ft.	315		
20	Storm Sewer, 8"	linear ft.	163		
21	Storm Sewer, 12"	linear ft.	613		
22	Storm Sewer, 15"	linear ft.	70		
23	Storm Sewer, 18"	linear ft.	161		
24	Storm Sewer Inlet, Type A	each	4		
25	Storm Sewer Inlet, Type G-1	each	6		
26	Storm Sewer Inlet, Type G-1 Double	each	1		
27	Storm Sewer Manhole, Type G-1, 4' Dia.	each	1		
28	Storm Sewer Manhole, Type 1, 4' Dia.	each	4		
29	Connect Manhole to Existing Storm Sewer	each	1		
30	Connect to Existing 4' x 5' Storm Sewer	each	1		
31	Storm Sewer Cleanout	each	3		
32	Downspout Connection	each	7		
33	Adjust Existing Utility Manhole	each	4		
34	Fire Hydrant Assembly	each	1		
35	Adjust Handhole	each	2		
36	Adjust Existing Valve Box	each	5		
37	Trench Backfill, Sand	CY	155		
38	Trench Backfill, CLSM	CY	37		
39	Potable Water Supply/Drinking Fountain	LS	1		
40	Sanitary Service, 6"	linear ft.	145		

41	Sanitary Cleanout	each	3		
42	Connect to Existing Sanitary Sewer	each	1		
43	Exploration Trench	each	10		
44	Barrier Curb and Gutter (B-6.12)	linear ft.	1011		
45	Mountable Curb and Gutter (M-4.12)	linear ft.	119		
46	Barrier Curb	linear ft.	116		
47	Depressed Curb	linear ft.	246		
48	PCC Driveway Pavement, 8"	sq. yd.	3590		
49	PCC Sidewalk, 5"	sq. ft.	13060		
50	PCC Colored Sidewalk, 5"	sq. ft.	770		
51	Gravel Surface	sq. ft.	965		
52	Sidewalk Patch	sq. ft.	196		
53	Pavement Patch	sq. ft.	202		
54	Detectable Warning Surface	sq. ft.	110		
55	Paint Pavement Marking - Line 4"	linear ft.	2033		
56	Paint Pavement Marking - Line 12"	linear ft.	51		
57	Paint Pavement Marking - Letters and Symbols	sq. ft.	9.3		
58	Restroom Building - Structure	LS	1		
59	All electrical in / at Restroom Building complete	LS	1		
60	All Mechanical heaters, exhaust fans and controls in Restroom Building complete	LS	1		
61	All Plumbing items, fixtures and piping in / at Restroom Building complete	LS	1		
62	S1 type fixtures, poles and concrete bases	each	3		
63	S2 type fixtures, poles and concrete bases.	each	4		
64	S3 type fixtures, poles and concrete bases	each	6		
65	S4 type fixtures, poles and concrete bases	each	2		
66	S5 LED lighting at feature walls	each	4		
67	S6 LED string lighting and drivers	each	6		
68	S7 type fixture, pole and concrete base	each	2		
69	All weatherproof duplex receptacles and covers	LS	1		
70	All conduits and conductors complete on the site	LS	1		
71	Trenching and backfilling for all underground conduits required for lighting, power, fiber optics and data cabling	LS	1		
72	Fiber optic and data cabling on site	LS	1		
73	Data rack cabinet and associated patch panels in Restroom Building	LS	1		
74	NEMA 4X cabinets and misc. materials at feature walls	LS	1		
75	Time clock and photo cell	LS	1		

76	Water feature controls and integration to irrigation system	LS	1		
77	Handicap Parking Signs	each	3		
78	Dumpster Enclosure Screen Panels	linear ft.	80		
79	Dumpster Gates	linear ft.	35		
80	Seat Walls, 19" ht.	linear ft.	27		
81	Plaza Walls, 43" ht. (including granite & engraved sign)	linear ft.	48		
82	Parking Lot Sign	each	1		
83	Planters	each	2		
84	Trash Receptacles	each	4		
85	Sculpture relocation	each	1		
86	Flagpoles	each	2		
87	Bicycle Racks	each	5		
88	Benches	each	9		
89	Retractable Bollards	each	2		
90	Water Wall	LS	1		
91	Imported Topsoil	cu. yd.	410		
92	Shade Trees	each	20		
93	Ornamental Trees	each	3		
94	Evergreen Shrubs	each	17		
95	Deciduous Shrubs	each	71		
96	Ornamental Grass	each	147		
97	Perennials	each	304		
98	Groundcover	each	1470		
99	Bulbs	each	100		
100	Turf Sod	sq. yd.	1030		
101	Irrigation System	LS	1		

TOTAL BASE BID	

ALTERNATE BID 1

Item #	Item Description	Unit	Quantity	Unit Price	Extended Price
1	Restroom Building B - Structure	LS	1		
2	All electrical in / at Restroom Building complete	LS	1		
3	All Mechanical heaters, exhaust fans and controls in Restroom Building complete	LS	1		
4	All Plumbing items, fixtures and piping in / at Restroom Building complete	LS	1		
5	PCC Sidewalk, 5"	sq. ft.	-50		
6	Turf Sod	sq. yd.	25		

TOTAL ALTERNATE BID 1	

Note: Alternate Bid 1 is for the entire restroom building, not just the addition. If Alternate 1 is selected, Base Bid Item numbers 58, 59, 60, and 61 will be omitted from the total base bid.

SPECIAL PROVISIONS

COMPLETION DATE

All work under this contract with the exception of landscaping items, shall be completed by August 1, 2019. All plants, bushes, trees, and plants shall not be planted in the months of June or July. The Contractor will be allowed to install sod and all plants, bushes, and trees in September 2019 but all landscaping items shall be completed by September 30, 2019. Contractor will not be allowed to start prior to 2/1/2019 unless otherwise approved by the City.

PUBLIC COMPLAINTS

All complaints to the Contractor or any of the subcontractors are to be reported in writing immediately to the City's representative. This written report will include the name, address, and telephone number of the complainant, a detailed description of the complaint, and a detailed description of the actions taken.

The Contractor shall endeavor, with the cooperation and concurrence of the City, to communicate with abutting property owners affected by the work.

The Contractor shall respond to citizen complaints, concerns, or inquiries within 48 hours. The City will be given the results of the Contractor's response and resolution of same in writing in a timely manner.

This work will not be paid for separately but shall be considered incidental to the contract and no additional compensation will be allowed.

HOUSEKEEPING

The jobsite shall be maintained with a neat and orderly appearance. The Contractor is to keep adjacent sidewalks and roadways clean from construction debris by sweeping or power washing on an as needed basis or as determined by the Owner. Contractor will be responsible for mowing in terraces as needed or requested once construction begins for the duration of the project. All housekeeping work shall be considered included in the cost of contract and no other compensation will be allowed.

SAW CUTS

Saw cuts shall be made for removal of ALL existing pavement, concrete curb and sidewalk as designated by the plans or as directed by the Resident Engineer in order to obtain a straight, smooth and uniform joint for matching proposed improvements. The cuts shall be FULL-DEPTH for ALL removals. The Resident Engineer will mark the locations of removals with paint and quantities will be measured to those points.

Should the Contractor fail to make the saw cuts prior to removal or otherwise extend removal beyond the marked saw cuts, a new saw cut shall be marked and additional removal and replacement quantities shall be made at the expense of the Contractor. The same shall also hold true when a good sawed edge is destroyed by subsequent vehicular traffic or careless use of construction equipment.

Saw cuts shall be included in the unit bid price per unit for the pay item that applies, and no additional compensation allowed.

CONSTRUCTION LAYOUT

The Contractor shall be responsible for establishing any controls during construction as needed for horizontal and vertical alignment. This work shall include ALL layouts for the project, including all curb and gutter, pavement, restroom building, drainage structures and pipes, sidewalks, driveways, all earth grades, and all other construction items. This work shall not be paid separately but shall be included in the cost of the various items of work for the project.

LABOR AND MATERIAL PAYMENT

The Contractor shall not commence work under this contract until he or she has obtained a Labor and Material Payment Bond, which has been approved by the City for the full amount of the contract, nor shall the Contractor allow any subcontractor to commence work on his subcontract until subcontractor has a similar bond or the Contractor's bond covers the subcontractor's Labor and Material payment.

INSURANCE

The Contractor shall carry insurance as outlined in these special provisions. In addition, the Contractor shall provide a $ 3 million umbrella liability policy instead of the $ 2 million umbrella liability insurance policy listed elsewhere in these special provisions. The City of Galesburg shall be named as additional insured on the policy.

PREVAILING WAGE

Not less than the Prevailing Rate of Wages as found by the City of Galesburg, or the Department of Labor, or determined by the Court of Review, shall be paid to all Laborers, Workmen, and Mechanics performing work under this contract.

CERTIFIED PAYROLLS

All work is subject to the Davis-Bacon Act and all prevailing wage laws. The Contractor and all subcontractors shall submit certified copies of payroll weekly for all work undertaken on the project. Failure to keep current on submittal of payroll reports shall be cause to withhold payment of completed work.

Current Prevailing Wage Rates for Knox County 10/22/2018

County	Trade Title	Region	Type	Class	Base Wage	Foreman Wage	OT M-F	OT Sa	OT Su	OT Hol	H/W	Pension	Vacation	Training	Other Fringe Benefit
Knox	ASBESTOS	All	BLD		30.14	31.14	1.5	1.5	2	2	8.92	14.66	0	0.8	0
Knox	ASBESTOS	All	HWY		29.69	30.44	1.5	1.5	2	2	8.92	14.32	0	0.8	0
Knox	ASBESTOS	ALL	BLD		22.7	23.7	1.5	1.5	2	2	6.7	5.05	0	0.65	0
Knox	BOILERMA	All	BLD		40	43	2	2	2	2	7.07	18.19	0	0.4	0
Knox	BRICK MA	All	BLD		34.1	35.6	1.5	1.5	2	2	10.35	11.32	0	0.82	0
Knox	CARPENTE	All	BLD		32.46	34.71	1.5	1.5	2	2	8.55	18	0	0.64	0
Knox	CARPENTE	All	HWY		34.04	36.29	1.5	1.5	1.5	1.5	17.5	8.45	0	0.52	0
Knox	CEMENT M	All	ALL		29.41	34.5	1.5	1.5	2	2	7.05	14.81	0	0.65	3.43
Knox	CEMENT M	All	HWY		29.75	31.25	1.5	1.5	2	2	31.25	13.95	0	0.6	
Knox	CERAMIC T	All	BLD		31.78	31.78	1.5	1.5	2	2	10.35	11.32	0	0.8	0
Knox	ELECTRIC F	All	ALL		45.09	56.52	1.5	1.5	2	2	7.1	12.62	0	0.45	0
Knox	ELECTRIC F	All	ALL		30.81	56.52	1.5	1.5	2	2	6.67	8.62	0	0.31	0
Knox	ELECTRIC F	All	ALL		50.11	56.52	1.5	1.5	2	2	7.25	14.03	0	0.5	0
Knox	ELECTRIC F	All	ALL		32.32	56.52	1.5	1.5	2	2	6.72	9.05	0	0.32	0
Knox	ELECTRICI/	All	BLD		36.51	38.51	1.5	1.5	2	2	7.65	12.8	0	0.8	0
Knox	ELECTRON	All	BLD		28		1.5	1.5	2	2	7.1	11.44	0	0.4	0
Knox	ELEVATOR	All	BLD		44.78	50.38	2	2	2	2	15.43	16.61	3.58	0.61	0
Knox	GLAZIER	All	BLD		29.21	0	1.5	1.5	1.5	1.5	6.94	7.67	0	0.65	0
Knox	HT/FROST	All	BLD		32.11	32.61	1.5	1.5	2	2	6.95	13.15	0	1.05	0
Knox	IRON WOR	NW	ALL		30.75	33.21	1.5	1.5	2	2	9.79	12.94	1.8	0.69	0
Knox	IRON WOR	SE	BLD		32.41	34.31	1.5	1.5	2	2	10.66	15.47	0	0.54	0
Knox	IRON WOR	SE	HWY		36.82	38.82	1.5	1.5	2	2	10.66	15.47	0	0.64	0
Knox	IRON WOR	SW	ALL		26.25	28.5	1.5	1.5	2	2	8.13	14.37	0	0.6	0
Knox	LABORER	All	BLD		29.14		1.5	1.5	2	2	8.2	12.06	3.09	0.8	0
Knox	LABORER	All	HWY		28.69	29.44	1.5	1.5	2	2	8.92	14.32	0	0.8	0
Knox	LABORER,	All	BLD		29.14	31.31	1.5	1.5	2	2	8.2	12.06	0	0.8	3.81
Knox	LABORER,	All	HWY		28.8	29.8	1.5	1.5	1.5	1.5	14.07	8.52	0	0.8	0
Knox	LATHER	All	BLD		32.46	34.71	1.5	1.5	2	2	8.55	18	0	0.54	0
Knox	MACHINEF	SE	HWY		36.82	38.82	1.5	1.5	2	2	10.66	15.47	0	0.64	0
Knox	MACHINIS	All	BLD		48.38	50.88	1.5	1.5	2	2	7.23	8.95	1.85	1.47	0
Knox	MARBLE FI	All	BLD		31.78	31.78	1.5	1.5	2	2	10.35	11.32	0	0.8	0
Knox	MARBLE M	All	BLD		34.02	35.27	1.5	1.5	2	2	10.35	11.32	0	0.82	0
Knox	MILLWRIG	All	BLD		32.24	34.49	1.5	1.5	2	2	8.55	18.57	0	0.54	0
Knox	MILLWRIG	All	HWY		35.01	37.26	1.5	1.5	2	2	8.55	18.8	0	0.52	0
Knox	OPERATIN	All	BLD	1	40.01	43.01	1.5	1.5	2	2	10	19.73	0	3.3	0
Knox	OPERATIN	All	BLD	2	37.07	43.01	1.5	1.5	2	2	10	19.73	0	3.3	0
Knox	OPERATIN	All	BLD	3	32.21	43.01	1.5	1.5	2	2	10	19.73	0	3.3	0
Knox	OPERATIN	All	HWY	1	40.02		1.5	1.5	2	2	10	19.73	0	1.65	0
Knox	OPERATIN	All	HWY	2	40.02		1.5	1.5	2	2	9	12.23	7	1.5	0.13
Knox	OPERATIN	All	HWY	3	32.22	43.02	1.5	1.5	2	2	10	19.73	0	3.3	0
Knox	PAINTER	All	ALL		28.42	29.42	1.5	1.5	1.5	2	6.05	8.9	0	0.92	0
Knox	PAINTER O	ALL	ALL		30.42	32.75	1.5	1.5	1.5	1.5	5.6	7.15	0	0.52	0
Knox	PAINTER P	ALL	ALL		28.92	31.25	1.5	1.5	1.5	1.5	5.6	7.15	0	0.52	0
Knox	PILEDRIVE	All	BLD		33.46	35.71	1.5	1.5	2	2	8.55	18	0	0.54	0
Knox	PILEDRIVE	All	HWY		34.66	36.91	1.5	1.5	2	2	8.55	18.6	0	0.52	0
Knox	PIPEFITTEF	All	ALL		39.6	43.56	1.5	1.5	2	2	7.05	14.35	0	1.34	0
Knox	PLASTEREF	All	BLD		29.91	31.16	1.5	1.5	2	2	8.65	17.24	0	0.8	0
Knox	PLUMBER	All	ALL		39.2		1.5	1.5	1.5	1.5	7	14.24	0	1.25	0
Knox	ROOFER	All	BLD		26.75		1.5	1.5	2	2	9.34	6.92	0	0.29	0
Knox	SHEETMET	All	BLD		32.93	35.2	1.5	1.5	2	2	7.14	13.91	0	0.7	0
Knox	SIGN HAN	SE	HWY		36.82	38.82	1.5	1.5	2	2	10.66	15.47	0	0.64	0
Knox	SPRINKLER	ALL	BLD		37.12	39.87	1.5	1.5	2	2	8.42	8.5	0	0.35	0
Knox	STEEL ERE	SE	HWY		36.82	38.82	1.5	1.5	2	2	10.66	15.47	0	0.64	0
Knox	STONE MA	All	BLD		34.1	35.6	1.5	1.5	2	2	10.35	11.32	0	0.82	0
Knox	TERRAZZO	All	BLD		31.78	31.78	1.5	1.5	2	2	10.35	11.32	0	0.8	0
Knox	TERRAZZO	All	BLD		34.02	35.27	1.5	1.5	2	2	10.35	11.32	0	0.82	0
Knox	TILE MASC	All	BLD		34.02	35.27	1.5	1.5	2	2	10.35	11.32	0	0.82	0
Knox	TRUCK DRI	All	ALL	1	37.06	41.07	1.5	1.5	2	2	12.65	6.12	0	0.25	0
Knox	TRUCK DRI	All	ALL	2	36.67		1.5	1.5	1.5	1.5	5.89	12.16	0	0.25	0
Knox	TRUCK DRI	All	ALL	3	36.91		1.5	1.5	1.5	1.5	5.89	12.16	0	0.25	0
Knox	TRUCK DRI	All	ALL	4	37.25		1.5	1.5	2	1.5	5.89	12.16	0	0.25	0
Knox	TRUCK DRI	All	ALL	5	39.21	41.07	1.5	1.5	2	2	12.65	6.12	0	0.25	0
Knox	TRUCK DRI	All	O&C	1	29.65	32.86	1.5	1.5	2	2	12.65	6.12	0	0.25	0
Knox	TRUCK DRI	All	O&C	2	30.08	32.86	1.5	1.5	2	2	12.65	6.12	0	0.25	0
Knox	TRUCK DRI	All	O&C	3	30.28	32.86	1.5	1.5	2	2	12.65	6.12	0	0.25	0
Knox	TRUCK DRI	All	O&C	4	30.56	32.86	1.5	1.5	2	2	12.65	6.12	0	0.25	0
Knox	TRUCK DRI	All	O&C	5	31.37	32.86	1.5	1.5	2	2	12.65	6.12	0	0.25	0
Knox	TUCKPOIN	All	BLD		34.1	35.6	1.5	1.5	2	2	10.35	11.32	0	0.82	0

SPECIAL PROVISIONS TO COVER
CONTRACTOR'S AND MUNICIPAL VENDORS
(As Amended 05/17/16)

The Contractor, or Municipal Vendor, shall not commence work under this contract until he has obtained all insurance required under this section, and such insurance has been approved by the City; nor shall the Contractor allow any sub-contractor to commence work on his sub-contract until all similar insurance required of the sub-contractor has been approved by the City.

The Contractor shall obtain and thereafter keep in force the following insurance coverages provided by insurance companies acceptable to the City and authorized to transact business under the laws of the State of Illinois. The insurance companies providing coverage shall be rated in the Best's Key Rating Guide. The City will accept companies with a rating not lower than B+ provided the financial size category is VII or larger. Companies rated A- or better shall have a financial size category of not less than VI. Coverage limits shall be written at not less than the minimum specified in this section. Higher minimum limits and additional coverage may be specified by a special provision elsewhere in the contract. Whether stated in this section or elsewhere, the City does not warrant the adequacy of the types of insurance coverage or the limits of liability specified.

(a) Workers Compensation and Employers Liability

(1) Workers compensation shall be provided according to the provisions of the Illinois Worker's Compensation Act, as amended. Notwithstanding the rating and financial size categories stated in this section, coverage may be provided by a group self-insurer authorized in Section 4(a) of the Act and approved pursuant to the rules of the Illinois Department of Insurance.

(2) Employers Liability.

a.	Each Accident	$500,000
b.	Disease-policy limit	$500,000
c.	Disease-each employee	$500,000

(b) Commercial General Liability. Required liability insurance coverage shall be written in the occurrence form and shall provide coverage for operations of the Contractor; operations of subcontractors (contingent or protective liability); completed operations; broad form property damage and hazards of explosion, collapse and underground; and contractual liability. The general aggregate limit shall be endorsed on a per project basis.

(1) General Aggregate Limit	$2,000,000
(2) Products-Completed Operation Aggregate Limit	$2,000,000
(3) Each Occurrence Limit	$1,000,000

The coverage shall provide by an endorsement in the appropriate manner and form, the City, its officers, and employees shall be named as additional insureds with respect to the policies and any umbrella excess liability coverage for occurrences arising in whole or in part out of the work and operations performed. The City may accept a separate owner's protective liability policy in lieu of the City, it's officers, and employees being insureds on the Contractor's policies.

(c) Commercial Automobile Liability. The policy shall cover owned, non-owned, and hired vehicles.

Bodily Injury & Property Damage Liability Limit Each Occurrence	$1,000,000

(d) Umbrella Liability. Any policy shall provide excess limits over and above the other insurance limits stated in this Article. The Contractor may purchase insurance for the full limits required or by a combination of primary policies for lesser limits and remaining limits provided by the umbrella policy.

All insurance shall remain in force during the period covering occurrences happening on or after the effective date and remain in effect during performance of the work and at all times thereafter when the Contractor may be correcting, removing, or replacing defective work until notification of the date of final inspection. Termination or refusal to renew shall not be made without 30 days prior written notice to the City by the insurer and the policies shall be endorsed so as to remove any language restricting or limiting liability concerning this obligation.

Certified copies of the original policies or certificate(s) of insurance by the insurer(s) issuing the policies and endorsements setting forth the coverage, limits, and endorsements shall be filed with the City before the City will execute the contract. A certificate of insurance shall include a statement "the coverage and limits conform to the minimums required by Article 107.27 of the Standard Specifications for Road and Bridge Construction". Any exception or deviation shall be brought to the attention of the City for a ruling of acceptability. In no event shall any failure of the City to receive policies or certificates or to demand receipt be construed as a waiver of the Contractor's obligation to obtain and keep in force the required insurance.
All costs for insurance as specified herein will be considered as included in the cost of the contract. The Contractor shall, at his/her expense and risk of delay, cease operations if the insurance required is terminated or reduced below the required amounts of coverage. Coverage in the minimum amounts set forth herein shall not be construed to relieve the Contractor from his/her obligation to indemnify in excess of the coverage according to the contract.

The contractor, prior to execution of the contract, shall file with the City copies of completed certificates of insurance, satisfactory to the City, to afford protection against all claims for damages to public or private property, and injuries to persons, arising out of and during the progress of the work to its completion, being whenever the improvement called for by the contract shall have been completely performed on the part of the contractor and all parts of the work have been approved and accepted by the City, and the final payment made. The policy of insurance shall include the City as an additional insured or provide separate coverage with an Owner's Protective policy.

**Language of coverage in this section taken from IDOT Standard Specifications adopted April 1, 2016*

RETURN WITH BID

Attachment #1

Route_____ Section _____
Project _____ County Knox

H. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS - Instructions for Certification

1. By signing and submitting this proposal, the prospective primary participant is providing the certification set out below.

2. The inability of a person to provide the certification required below will not necessarily result in the denial of participation in this covered transaction. The prospective participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department of agency's determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an explanation shall disqualify such person from participation in this transaction.

3. The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause of default.

4. The prospective primary participant shall provide immediate written notice to the department or agency to which this proposal is submitted if at any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

5. The terms "covered transaction", "debarred", "suspended", "ineligible", "lower tier covered transaction", "participant", "person", "primary covered transaction", "principal" "proposal" and "voluntarily excluded", as used in this clause have the meaning set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. You may contact the department or agency to which this proposal is being submitted for assistance in obtaining a copy of those regulations.

6. The prospective primary participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

7. The prospective primary participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transaction", provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

8. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but it is not required to, check the No procurement List (Tel. #).

9. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which does a prudent person in the ordinary course of business dealings normally possess.

10. Except for transactions authorized under paragraph 8 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, AND OTHER
RESPONSIBILITY MATTERS - PRIMARY COVERED TRANSACTIONS

1. The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or Local) transaction or contract under a public transaction: Violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or Local) with commission of any of the offenses enumerated in paragraph (1) (b) of this certification; and

d. Have not within a three-year period preceding this application/proposal, had one or more public transactions (Federal, State or Local) terminated for cause or default.

2. Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

NAME OF BIDDER_____

Print Name of Bidder - Signature(s) to be affixed to Proposal Signature Sheet)

City of Galesburg

Operating Under Council – Manager Government Since 1957

The City of Galesburg will no longer be issuing checks for vendor payments. The City will pay vendors through ACH by automatically depositing payments to a bank checking/savings account or payment to vendors can be made by credit card at the time of purchase.

In order to process your next payment, **please fill out the following information and provide a copy of a void check.** Please mail to City of Galesburg, Accounts Payable, P.O. Box 1589, Galesburg, IL 61402-1589 or fax the completed form and a void check, if the funds are being deposited to a checking account, to the fax number listed below.

Vendor Name: _____

Address: _____

City, State, Zip Code: _____

Phone Number: _____

Email Address: _____

Bank Name: _____

Checking/Savings Acct Number: _____
(Please indicate type of account by circling Checking or Savings)

Bank Routing Number: _____

Signature: _____

Payment information will be e-mailed to you approximately two days prior to the funds being credited to your bank account. If you have any questions, please contact me.

Tifani Miller
Accounts Payable
City of Galesburg
309/345-3674
309/343-4765 fax
tmiller@ci.galesburg.il.us

THIS FORM IS BASED ON IRS REQUIRMENTS FOR THE SAME ESSENTIAL INFORMATION AS A W-9

RETURN TO: CITY OF GALESBURG
ATTN: A/P
55 W TOMPKINS ST
GALESBURG, IL 61401

OR FAX TO: 309-343-4765

The following information is needed to complete your vendor file and to comply with IRS requirements. Please fill out this form as completely as possible to ensure proper payment to you. Please return completed form as soon as possible to The City of Galesburg at the above address or fax number. Please call 309-345-3674 with any questions.

BUSINESS NAME: _____

INDIVIDUAL NAME: _____
(for Sole Proprietors as appears on Social Security Card)

BUSINESS ADDRESS: _____

CITY, STATE, ZIP: _____

YOUR TAXPAYER IDENTIFICATION NUMBER: _____
(FEIN or business tax ID. No.)

OR, YOUR SOCIAL SECURITY NUMBER: _____
If using SSN, enter the name on the card above as Individual Name.)

PLEASE CHECK APPROPRIATE BOX:

☐ Individual/Sole Proprietor ☐ Corporation ☐ Partnership ☐ Other _____

YOUR COMPANY PROVIDES:

☐ Legal Services ☐ Services ☐ Materials ☐ Other _____

ARE YOU SUBJECT TO BACKUP WITHHOLDING?

☐ Yes ☐ No

PERSON TO CONTACT: _____

PHONE NUMBER: _____

UNDER PENALTY OF PERJURY, I CERTIFY THAT THE INFORMATION PROVIDED ABOVE IS CORRECT AND COMPLETE.

_____ _____
Signature Date

_____
Title

FOR OFFICE USE ONLY

☐ ENTERED INTO SYSTEM VENDOR NUMBER: _____

Park Plaza and Parking Lot E

City of Galesburg

SCHEDULE OF PLANS AND SPECIFICATIONS

The following plans and specifications describe the project work to be completed.

PROJECT PLANS

CIVIL ENGINEERING

C-100 General Notes & Legend
C-101 Demolition Plan
C-102 Site Plan
C-103 Grading Plan Plaza
C-104 Grading Plan Parking Lot
C-105 Grading Plan Vacant Lot
C-106 Utility Plan
C-107 Details I
C-108 Details II

LANDSCAPE ARCHITECTURE

L-100 Overall Site Improvement Plan
L-101 Parking Lot E Improvement Plan
L-102 Park Plaza Improvement Plan
L-103 Planting Plan
L-104 Irrigation Plan
L-105 Site Details
L-106 Plaza Wall Details
L-107 Plaza Wall Details 2
L-108 Dumpster Enclosure Details
L-109 Planting and Drain Tile Details
L-110 Irrigation Details

ARCHITECTURAL

A-100 Restroom Building Plans
A-200 Restroom Schedules and Notes
A-300 Restroom Building Plans – Alt. #1
A-400 Restroom Building General Notes

PLUMBING

P-200 Park Restroom Plans – Plumbing Waste & Vent Piping
P-201 Park Restroom Plans – Plumbing Water Piping
P-300 Legend, Schedules and Details

MECHANICAL

M-200 Park Restroom Plans – Mechanical

ELECTRICAL ENGINEERING

E-100 Parking Lot E Plan – Electrical
E-101 Park Plaza Plan – Electrical
E-102 Legend, Schedules and Details
E-200 Park Restroom Plans – Electrical Lighting
E-201 Park Restroom Plans – Electrical Power

PROJECT SPECIFICATIONS

DIVISION 26 – ELECTRICAL

DIVISION 31 – EARTHWORK

DIVISION 32 – EXTERIOR IMPROVEMENTS

DIVISION 33 – UTILITIES

SECTION 011000 - SUMMARY

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. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Phased construction.
4. Work by Owner.
5. Work under separate contracts.
6. Access to site.
7. Coordination with occupants.
8. Work restrictions.
9. Specification and drawing conventions.

B. PROJECT INFORMATION Project Identification: City of Galesburg Park Plaza and Parking Lot E

C. Project Location: Park Plaza (130 East Main Street) and Parking Lot E (151 E. Simmons Street), Galesburg, IL

D. Owner: City of Galesburg, 55 W. Tompkins Street, Galesburg, IL 61402.

E. Owner's Representative: Andy Logsdon, Bruner, Cooper, & Zuck, Inc. 188 E. Simmons Street, Galesburg, IL 61401

F. Landscape Architects: Massie Massie & Associates, 1210 South 5th Street, Springfield, IL 62703.

G. Engineers and Architect: Bruner, Cooper, & Zuck, Inc. 188 E. Simmons Street, Galesburg, IL 61401

H. Mechanical, Electrical, and Plumbing Engineers: Johnson Engineering, P.C. 1 North Old State Capitol Plaza, Suite 310, Springfield, IL 62701.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. The project includes demolition of the park plaza amphitheater and removal of asphalt paving, concrete sidewalks and curbs/gutters, and misc. Improvements include restroom building, concrete surfaces, colored concrete, dumpster enclosures, street patching, curbs and gutters, storm sewer, drainage improvements, and associated components. Features include site walls, water feature, parking lot lights, electrical wiring, light fixtures, and controls of various types. Project includes site furnishings – flag poles, benches, planters, bollards, wayfinding sign, trash receptacles, relocated sculpture, irrigation, and plant material.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

2. Project contract name is Park Plaza and Parking Lot E.

1.4 PHASED CONSTRUCTION

A. The Work shall be conducted in three phases, with each phase substantially complete as indicated:

1. The three phases shall be as follows:

a. Phase 1: Phase 1 shall be the Park Plaza area of the project. Phase 1 will be constructed simultaneously with the demolition of the 42 South Prairie Street building. The contractor shall coordinate with the demolition contractor.
b. Phase 2: Phase 2 shall be the eastern half of Parking Lot E.
c. Phase 3: Phase 3 shall be the western half of Parking Lot E.

2. The contractor shall not begin construction in the next phase without achieving substantial completion in the current phase unless they have approval from the Owner's Representative.

3. Existing utilities and storm sewer shall stay in service in each phase until work begins in that phase and new utilities and storm sewer are installed.

B. Before commencing work of each phase, submit an updated copy of Contractor's construction schedule showing the sequence, commencement and completion dates.

1.5 WORK BY OTHERS -

A. Utilities and services within the project area require modifications. Work will be done be employees or contractors for each utility or service. Those are:

1. Electric & Gas: Ameren
Julie Cone'
(309) 345-5169

2. Cable TV: Comcast

Kirt Kromphardt
(224) 229-3131

3. Telephone: CenturyLink
Darrell Schmidt
(309) 477-0255

4. Sanitary: Galesburg Sanitary District
Marshall Schrader
(309) 342-0131

5. Water: City of Galesburg Water Department
Tim Fey
(309) 345-3648

6. City Electric: City of Galesburg Electrician
Justin McNaught
(309) 345-3623

7. Fire Protection: City of Galesburg Fire Chief
Tom Simkins
(309) 345-3756

B. Cooperate fully with Other Contractors and Utility Owners so that work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Other Contractors or Utility Owners. Coordinate the Work of this Contract with work performed by Other Contractors and Utility Owners. Where required by the Contract Documents, make payments to the Utility Owners upon issuance of Notice to Proceed to commence scheduling of their work.

The Owner will retain a lighting commissioning agent to program the lighting and conduct lighting demonstrations. The Contractor shall provide access to the Owner's agent and cooperate and participate to the extent necessary to conduct the lighting demonstrations and commissioning. This may include providing lift trucks to allow lighting adjustments, attending mockup sessions, and coordinating the equipment and labor to allow commissioning.

1.6 ACCESS TO SITE

A. Contractor shall have use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.

B. Use of Site: Limit use of Project site to the property boundaries which are the project work limits. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Limits: Confine construction operations to property boundaries.

2. Maintain access through the public alleyway within the project to the extent possible.

3. Maintain the usability of public streets and sidewalks to the extent possible.

1.8 COORDINATION WITH OCCUPANTS

A. Full Owner Occupancy: Owner will occupy part of the parking lot during the entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.

1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
2. Notify Owner not less than forty-eight (48) hours in advance of activities that will affect Owner's operations.

B. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the Work, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.

1. Owner’s Representative will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner acceptance of the completed Work.
2. Obtain a Certificate of Occupancy from authorities having jurisdiction before limited Owner occupancy.
3. Before limited Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of Work.
4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of Work.

1.8 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

5. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

1. Notify Owner’s Representative not less than two (2) days in advance of proposed utility interruptions.
2. Obtain Owner’s Representative written permission before proceeding with utility interruptions.

C. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.

1. Notify Owner's Representative not less than two (2) days in advance of proposed disruptive operations.
2. Obtain Owner's Representative written permission before proceeding with disruptive operations.

D. Controlled Substances: Use of tobacco products and other controlled substances within the project area is not permitted.

E. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.

1. Maintain list of approved screened personnel with Owner's representative.

1.9 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

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. Section includes administrative and procedural requirements for handling and processing Contract modifications.

B. Related Requirements:

1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

1.3 MINOR CHANGES IN THE WORK

A. Owner’s Representative may issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions.

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Owner’s Representative will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Work Change Proposal Requests issued by Owner’s Representative are not instructions either to stop work in progress or to execute the proposed change.
2. Within time specified in Proposal Request or 20 days when not otherwise specified after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include costs of labor and supervision directly attributable to the change.
    d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and

finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

e. Quotation Form: Use forms acceptable to Owner's Representative.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Owner's Representative.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use form acceptable to Owner's Representative.

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Changes Proposal Request, Owner's Representative will issue a Change Order for signatures of Owner and Contractor on AIA Document G701

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Change Directive: Owner's Representative may issue a written Change Directive instructing Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 012900 - PAYMENT PROCEDURES

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. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Requirements:

1. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
2. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.

1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:

   a. Application for Payment forms with continuation sheets.
   b. Submittal schedule.
   c. Items required to be indicated as separate activities in Contractor's construction schedule.

2. Submit the schedule of values to Owner’s at earliest possible date, but no later than seven (7) days before the date scheduled for submittal of initial Application for Payment.

3. Retain "Subschedules for Phased Work" Subparagraph below if phasing is required. See the Evaluations in Section 011000 "Summary."

4. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values coordinated with each phase of payment.
5. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide subschedules showing values coordinated with each element. Retain "Format and Content" Paragraph below; revise to suit Project. If applicable, include a sample schedule of values at end of Section.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section or combine sections as appropriate.

1. Identification: Include the following Project identification on the schedule of values:

    a. Project name, project number, and location.
    b. Owner’s Representative Name
    c. Contractor's name and address.
    d. Date of submittal.

2. Arrange schedule of values consistent with format acceptable to Owner’s Representative.
3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:

    a. Related Specification Section or Division.
    b. Description of the Work.
    c. Name of subcontractor.
    d. Name of manufacturer or fabricator.
    e. Name of supplier.
    f. Change Orders (numbers) that affect value.
    g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

        1) Labor.
        2) Materials.
        3) Equipment.

4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five (5) percent of the Contract Sum.

    a. Include separate line items under principal subcontracts for Project closeout requirements in an amount totaling five (5 percent of the Contract Sum and subcontract amount.

5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
6. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.

7. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
8. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
9. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

    a. Major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.

10. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Owner's Representative and paid for by Owner.

    1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

C. Payment Application Times: Submit Application for Payment to Owner's Representative the tenth (10) of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.

    1. Submit draft copy of Application for Payment seven (7) days prior to due date for review by Owner's Representative. .

D. Application for Payment Forms: Use form acceptable to Owner's Representative.

E. Submit forms for approval with initial submittal of schedule of values.

F. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Owner's Representative will return incomplete applications without action.

    1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.

2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.

G. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

H. Transmittal: Submit three (3) signed and notarized original copies of each Application for Payment to Owner's Representative by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

I. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit conditional final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
5. Waiver Forms: Submit executed waivers of lien on forms, acceptable to Owner.

J. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule (preliminary if not final).
4. Products list (preliminary if not final).
5. Schedule of unit prices.
6. Submittal schedule (preliminary if not final).
7. List of Contractor's staff assignments.
8. List of Contractor's principal consultants.
9. Copies of building permits.
10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
11. Initial progress report.
12. Report of preconstruction conference.
13. Certificates of insurance and insurance policies.
14. Performance and payment bonds.

K. Application for Payment at Substantial Completion: After Owner's Representative Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

L. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements including lien waivers from contractor, sub-subcontractors and suppliers .
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

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. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General coordination procedures.
2. Coordination drawings.
3. Requests for Information (RFIs).
4. Project meetings.

B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.

C. Related Requirements:

1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
2. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work.

Each contractor shall coordinate its operations with operations, included in different Sections, that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components with other contractors to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

C. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

1.4 COORDINATION

1.5 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Owner's Representative
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: Use for acceptable to Owner's Representative.

D. Owner's Representative will review each RFI, determine action required, and respond. Allow seven (7) working days for response for each RFI.

1.6 PROJECT MEETINGS

A. General: Provide a location for meetings and conferences at Project site unless otherwise indicated.

1. Attendees: Owner, Prime Contractor, Subcontractors or others whose presence is required as determined by Owner's Representative.
2. Agenda: Owner's Representative will prepare the meeting agenda and distribute it to invited attendees.
3. Minutes: Owner's Representative will conduct the meeting, record significant discussions and agreements achieved, and distribute meeting minutes to everyone concerned.

B. Preconstruction Conference: Owner's Representative will schedule a preconstruction conference before commencement of construction, at a time convenient to Owner, Prime Contractor and others involved, but no later than fifteen (15) days after execution of the Agreement.

1. Attendees: Authorized representatives of Owner, Project Consultants, Prime Contractor and superintendent, Major Sub-contractors and superintendents, major suppliers, and other concerned parties.
2. Agenda: Discuss items of significance that could affect progress, including the following:

a. Tentative construction schedule.
b. Phasing.
c. Critical work sequencing and long-lead items.
d. Designation of key personnel and their duties.
e. Lines of communications.
f. Procedures for processing field decisions and Change Orders.
g. Procedures for RFIs.
h. Procedures for testing and inspecting.
i. Procedures for processing Applications for Payment.
j. Distribution of the Contract Documents.
k. Submittal procedures.
l. Preparation of record documents.
m. Use of the premises
n. Work restrictions.
o. Working hours.
p. Owner's occupancy requirements.
q. Responsibility for temporary facilities and controls.
r. Procedures for moisture and mold control.
s. Procedures for disruptions and shutdowns.
t. Construction waste management and recycling.
u. Parking availability.
v. Office, work, and storage areas.
w. Equipment deliveries and priorities.
x. First aid.
y. Security.
z. Progress cleaning.

3. Minutes: Owner’s Representative will record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Owner’s Representative of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

a. Contract Documents.
b. Options.
c. Related RFIs.
d. Related Change Orders.
e. Purchases.
f. Deliveries.
g. Submittals.
h. Sustainable design requirements.
i. Possible conflicts.
j. Compatibility requirements.
k. Time schedules.
l. Weather limitations.

m. Manufacturer's written instructions.
n. Warranty requirements.
o. Compatibility of materials.
p. Acceptability of substrates.
q. Temporary facilities and controls.
r. Space and access limitations.
s. Regulations of authorities having jurisdiction.
t. Testing and inspecting requirements.
u. Installation procedures.
v. Coordination with other work.
w. Required performance results.
x. Protection of adjacent work.
y. Protection of construction and personnel.

3. Owner's Representative will record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date. Revise "Progress Meetings" Paragraph below if Project requires holding progress meetings at different intervals. Insert special intervals such as "every third Tuesday" to suit special circumstances.

D. Progress Meetings: Conduct progress meetings for the purpose of coordinating work among participating trade contractors.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: Prime Contractor, Sub-contractors, suppliers and other concerned with the current progress or involved in planning of future activities. All representatives shall be knowledgeable of the project and authorized to conclude matters relating to the work.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

1) Review schedule for next period.

b. Review present and future needs of each entity present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.

6) Access.
7) Site utilization.
8) Temporary facilities and controls.
9) Progress cleaning.
10) Quality and work standards.
11) Status of correction of deficient items.
12) Field observations.
13) Status of RFIs.
14) Status of proposal requests.
15) Pending changes.
16) Status of Change Orders.
17) Pending claims and disputes.
18) Documentation of information for payment requests.

4. Minutes: Owner's Representative will record and distribute the meeting minutes to each party present and to parties requiring information.

5. Reporting: Distribute meeting memoranda to each party present and to parties who should have been present.

   a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

   b. Instructions to Contractor: Within the memoranda under "Discussion/Instructions to Contractors" portion of the construction reports, the Contractor may potentially be instructed to perform the following before the next progress meeting: minor changes in the Work, not involving an adjustment in the Contract Time and/or Sum, Orders to correct nonconforming or defective Work.

E. Coordination Meetings: Conduct Project coordination meetings at intervals to be determined. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

1. Attendees: Representatives of Owner, Project Consultants, Contractor, Subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

   a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions

are required to ensure that current and subsequent activities will be completed within the Contract Time.

b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.

c. Review present and future needs of each contractor present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Site utilization.
8) Temporary facilities and controls.
9) Work hours.
10) Hazards and risks.
11) Progress cleaning.
12) Quality and work standards.
13) Change Orders.

3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

4. Instructions to Contractor: Within the memoranda under “Discussion/Instructions to Contractors” portion of the construction reports, the Contractor may potentially be instructed to perform the following before the next progress meeting: minor changes in the Work, not involving an adjustment in the Contract Time and/or Sum, Orders to correct nonconforming or defective Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

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. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Startup construction schedule.
2. Contractor's construction schedule.
3. Construction schedule updating reports.
4. Daily construction reports.
5. Material location reports.
6. Site condition reports.
7. Special reports.

B. Related Requirements:
1. Section 013300 "Submittal Procedures" for submitting schedules and reports.
2. Section 014000 "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. Cost Loading: The allocation of the schedule of values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum unless otherwise approved by Architect.

C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

E. Event: The starting or ending point of an activity.

F. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

G. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.4 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. Working electronic copy of schedule file, where indicated.
2. PDF electronic file.
3. Two (2) paper copies.

B. Startup construction schedule.

1. Approval of cost-loaded, startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.

C. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.

D. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.

E. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.

1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.

3. Total Float Report: List of all activities sorted in ascending order of total float.
4. Earnings Report: Compilation of Contractor's total earnings from **the Notice to Proceed** until most recent Application for Payment.

F. Construction Schedule Updating Reports: Submit with Applications for Payment.

G. Daily Construction Reports: Submit at **monthly** intervals.

H. Material Location Reports: Submit at **monthly** intervals.

I. Site Condition Reports: Submit at time of discovery of differing conditions.

J. Special Reports: Submit at time of unusual event.

K. Qualification Data: For scheduling consultant.

1.5 QUALITY ASSURANCE

A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Architect's request.

B. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's construction schedule, including, but not limited to, the following:

1. Review software limitations and content and format for reports.
2. Verify availability of qualified personnel needed to develop and update schedule.
3. Discuss constraints.
4. Review delivery dates for Owner-furnished products.
5. Review schedule for work of Owner's separate contracts.
6. Review submittal requirements and procedures.
7. Review time required for review of submittals and resubmittals.
8. Review requirements for tests and inspections by independent testing and inspecting agencies.
9. Review time required for Project closeout and Owner startup procedures.
10. Review and finalize list of construction activities to be included in schedule.
11. Review procedures for updating schedule.

1.6 COORDINATION

A. Coordinate Contractor's construction schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for commencement of the date of final completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration: Define activities in logical time segments.
2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
3. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
4. Startup and Testing Time: Include no fewer than fifteen (15) days for startup and testing.
5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Owner’s Representative’s administrative procedures necessary for certification of Substantial Completion.
6. Punch List and Final Completion: Include not more than thirty (30) days for completion of punch list items and final completion.

C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.
2. Work under More Than One Contract: Include a separate activity for each contract.
3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
5. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
6. Work Restrictions: Show the effect of the following items on the schedule:

a. Coordination with existing construction.
b. Uninterruptible services.
c. Partial occupancy before Substantial Completion.
d. Use of premises restrictions.
e. Seasonal variations.
f. Environmental control.

7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:

    a. Subcontract awards.
    b. Submittals.
    c. Purchases.
    d. Fabrication.
    e. Sample testing.
    f. Deliveries.
    g. Installation.
    h. Tests and inspections.
    i. Adjusting.
    j. Curing.
    k. Startup and placement into final use and operation.

8. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:

    a. Site preparation and building demolition.
    b. Electrical and plumbing.
    c. Foundations for light towers.
    d. Pavements and, curb and gutters, miscellaneous work.
    e. Installation of light towers and lighting.
    f. Soil backfill and plant installation.
    g. Substantial Completion.

D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.

E. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.

1. See Section 012900 "Payment Procedures" for cost reporting and payment procedures.

F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

1. Unresolved issues.
2. Unanswered Requests for Information.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.
5. Pending modifications affecting the Work and Contract Time.

G. Recovery Schedule: When periodic update indicates the Work is fourteen (14) or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

H. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules using a Microsoft software.

I. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.

J. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:

1. Contractor or subcontractor and the Work or activity.
2. Description of activity.
3. Main events of activity.
4. Immediate preceding and succeeding activities.
5. Early and late start dates.
6. Early and late finish dates.
7. Activity duration in workdays.
8. Total float or slack time.
9. Average size of workforce.
10. Dollar value of activity (coordinated with the schedule of values).

K. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:

1. Identification of activities that have changed.
2. Changes in early and late start dates.
3. Changes in early and late finish dates.
4. Changes in activity durations in workdays.
5. Changes in the critical path.
6. Changes in total float or slack time.
7. Changes in the Contract Time.

L. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.

1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.

    a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
    b. Submit value summary printouts [**one week**] **<Insert time>** before each regularly scheduled progress meeting.

2.2 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including presence of rain or snow.
7. Accidents.
8. Meetings and significant decisions.
9. Unusual events (see special reports).
10. Stoppages, delays, shortages, and losses.
11. Meter readings and similar recordings.
12. Emergency procedures.
13. Orders and requests of authorities having jurisdiction.
14. Change Orders received and implemented.
15. Change Directives received and implemented.
16. Services connected and disconnected.
17. Equipment or system tests and startups.
18. Partial completions and occupancies.
19. Substantial Completions authorized.

B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:

1. Material stored prior to previous report and remaining in storage.
2. Material stored prior to previous report and since removed from storage and installed.
3. Material stored following previous report and remaining in storage.

C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.3 SPECIAL REPORTS

A. General: Submit special reports directly to Owner within **one** day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or

effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting using CPM scheduling.

1. In-House Option: Owner may waive the requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.
2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.

B. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate final completion percentage for each activity.

C. Distribution: Distribute copies of approved schedule to Owner’s Representative, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION

SECTION 013300 - SUBMITTAL PROCEDURES

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. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Requirements:

1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
3. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
4. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
5. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Owner’s Representative’s responsive action.

B. Informational Submittals: Written and graphic information and physical samples that do not require Owner’s Representative’s responsive action. Submittals may be rejected for not complying with requirements.

C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Owner's Representative's and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.

    a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

4. Format: Arrange the following information in a tabular format:

    a. Scheduled date for first submittal.
    b. Specification Section number and title.
    c. Submittal category: Action; informational.
    d. Name of subcontractor.
    e. Description of the Work covered.
    f. Scheduled date for final release or approval.
    g. Scheduled date of fabrication.
    h. Scheduled dates for purchasing.
    i. Scheduled dates for installation.
    j. Activity or event number.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals.

1. Architect will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings and Project record drawings.

    a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
    b. Digital Drawing Software Program: The Contract Drawings are available in AutoCAD.
    c. Contractor shall execute a data licensing agreement in a form agreeable to the Owner's Representative.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

    a. Owner's Representative's reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Owner's Representative's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow fifteen (15) days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Owner's Representative's will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow fifteen (15) days for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by consultants, Owner, or other parties is indicated, allow twenty-one (21) days for initial review of each submittal.

D. Paper Submittals: Place a permanent label or title block on each submittal item for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Owner's Representative.
3. Include the following information for processing and recording action taken:

    a. Project name.
    b. Date.
    c. Name of Architect.
    d. Name of Construction Manager.
    e. Name of Contractor.
    f. Name of subcontractor.
    g. Name of supplier.
    h. Name of manufacturer.
    i. Submittal number or other unique identifier, including revision identifier.

        1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).

j. Number and title of appropriate Specification Section.
k. Drawing number and detail references, as appropriate.
l. Location(s) where product is to be installed, as appropriate.
m. Other necessary identification.

4. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Owner's Representative's observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.

   a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Owner's Representative.

5. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Owner's Representative will discard submittals received from sources other than Contractor.

   a. Transmittal Form for Paper Submittals: Use form acceptable to Owner's Representative.
   b. Transmittal Form for Paper Submittals: Provide locations on form for the following information:

      1) Project name.
      2) Date.
      3) Destination (To:).
      4) Source (From:).
      5) Name and address of Architect.
      6) Name of Construction Manager.
      7) Name of Contractor.
      8) Name of firm or entity that prepared submittal.
      9) Names of subcontractor, manufacturer, and supplier.
      10) Category and type of submittal.
      11) Submittal purpose and description.
      12) Specification Section number and title.
      13) Specification paragraph number or drawing designation and generic name for each of multiple items.
      14) Drawing number and detail references, as appropriate.
      15) Indication of full or partial submittal.
      16) Transmittal number, numbered consecutively.
      17) Submittal and transmittal distribution record.
      18) Remarks.
      19) Signature of transmitter.

E. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.

a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).

3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Owner's Representative.
4. Transmittal Form for Electronic Submittals: Use acceptable to Owner**,** containing the following information:

a. Project name.
b. Date.
c. Name and address of Architect.
d. Name of Construction Manager.
e. Name of Contractor.
f. Name of firm or entity that prepared submittal.
g. Names of subcontractor, manufacturer, and supplier.
h. Category and type of submittal.
i. Submittal purpose and description.
j. Specification Section number and title.
k. Specification paragraph number or drawing designation and generic name for each of multiple items.
l. Drawing number and detail references, as appropriate.
m. Location(s) where product is to be installed, as appropriate.
n. Related physical samples submitted directly.
o. Indication of full or partial submittal.
p. Transmittal numbered consecutively.
q. Submittal and transmittal distribution record.
r. Other necessary identification.
s. Remarks.

5. Metadata: Include the following information as keywords in the electronic submittal file metadata:

a. Project name.
b. Number and title of appropriate Specification Section.
c. Manufacturer name.
d. Product name.

F. Options: Identify options requiring selection.

G. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

H. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.

3. Resubmit submittals will be processed in the same way as original submittals.

I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

J. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Owner's Representative's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Post electronic submittals as PDF electronic files directly to Owner's Representative's FTP site established for Project.

    a. Owner's Representative will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

2. Action Submittals: Submit three (3) paper copies of each submittal unless otherwise indicated. Two will be returned.
3. Informational Submittals: Submit two (2) paper copies of each submittal unless otherwise indicated. None will be returned.
4. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

    a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
    b. Provide a notarized statement on original paper copy certificates and certifications where indicated.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.

e. Testing by recognized testing agency.
f. Application of testing agency labels and seals.
g. Notation of coordination requirements.
h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

a. Wiring diagrams showing factory-installed wiring.
b. Printed performance curves.
c. Operational range diagrams.
d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before or concurrent with Samples.
6. Submit Product Data in the following format:

a. PDF electronic file.
b. Three (3) paper copies of Product Data unless otherwise indicated. Two (2) will be returned.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

a. Identification of products.
b. Schedules.
c. Compliance with specified standards.
d. Notation of coordination requirements.
e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 42 inches.
3. Submit Shop Drawings in the following format:

a. PDF electronic file.
b. Three (3) opaque (bond) copies of each submittal. Two (2) will be returned.
c. Refer to Section 013100 "Project Management and Coordination" for requirements for coordination drawings.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:

a. Generic description of Sample.
b. Product name and name of manufacturer.
c. Sample source.
d. Number and title of applicable Specification Section.
e. Specification paragraph number and generic name of each item.

3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

   a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
   b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

   a. Number of Samples: Submit one (1) full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Samples will be returned with options selected.

6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

   a. Number of Samples: Submit three (3) sets of Samples. Two (2) sets will be retained, one (1) will be returned.

      1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
      2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three (3) sets of paired units that show approximate limits of variations.

E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

   1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.

2. Manufacturer and product name, and model number if applicable.
3. Number and name of room or space.
4. Location within room or space.
5. Submit product schedule in the following format:

    a. PDF electronic file.
    b. Three (3) paper copies of product schedule or list unless otherwise indicated. Two (2) will be returned.

F. Coordination Drawing Submittals: Comply with requirements specified in Section 013100 "Project Management and Coordination."

G. Contractor's Construction Schedule: Comply with requirements specified in Section 013200 "Construction Progress Documentation."

H. Application for Payment and Schedule of Values: Comply with requirements specified in Section 012900 "Payment Procedures."

I. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 014000 "Quality Requirements."

J. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 017700 "Closeout Procedures."

K. Maintenance Data: Comply with requirements specified in Section 017823 "Operation and Maintenance Data."

L. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

M. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

N. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

O. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

P. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

Q. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

R. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

S. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

T. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

1. Name of evaluation organization.
2. Date of evaluation.
3. Time period when report is in effect.
4. Product and manufacturers' names.
5. Description of product.
6. Test procedures and results.
7. Limitations of use.

U. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

V. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

W. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

X. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.2 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file and three (3) paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Owner’s Representative.

B. Project Closeout and Maintenance Material Submittals: See requirements in Section 017700 "Closeout Procedures."

C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 OWNER’S REPRESENTATIVE ACTION

A. Action Submittals: Owner’s Representative and other technical specialists will review each submittal, make marks to indicate corrections or revisions required, and return it. Reviewer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.

B. Informational Submittals: Owner’s Representative will review each submittal and will not return it, or will return it if it does not comply with requirements. will forward each submittal to appropriate party.

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Owner’s Representative.

D. Incomplete submittals are unacceptable,and will be returned for resubmittal without review.

E. Submittals not required by the Contract Documents may be returned without action.

END OF SECTION

SECTION 014000 - QUALITY REQUIREMENTS

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. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-control services required by Owner’s Representative or authorities having jurisdiction are not limited by provisions of this Section.
4. Specific test and inspection requirements are not specified in this Section.

1.3 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed project Consultants.

C. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

D. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

E. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five (5) previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 ACTION SUBMITTALS

A. Delegated Design Submittal. In addition to Shop Drawings, Product Data and other required submittals, submit a statement signed and sealed by the responsible design professional for each product and system specifically assigned to Contractor to be designated or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include a list of codes, loads and other factors used in performing these services.

B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

C. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

C. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

D. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

E. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

F. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

G. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor responsibilities include the following:

a. Provide test specimens representative of proposed products and construction.
b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Owner's Representative with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

1.6 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
2. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.
3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.

    a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

3. Notify testing agencies at least twenty-four (24) hours in advance of time when Work that requires testing or inspecting will be performed.
4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

1.7 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner.

B. Testing Agency will:

1. Notify Owner's Representative and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
2. Submit a certified written report of each test, inspection, and similar quality-control service to Owner's Representative and copies to the Contractor and to authorities having jurisdiction.
3. Submit a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
4. Interpret tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
5. Retest and reinspect corrected work.
6.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."

D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

E. Testing Agency Responsibilities: Cooperate with Owner's Representative and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Owner's Representative and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

H. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Submit Schedule concurrently with Contractor's construction schedule. Update as the Work progresses.

1. Distribution: Distribute schedule to Owner, Owner's Representative, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 ACCEPTABLE TESTING AGENCIES

A. Whitney & Associates, Inc., 2406 West Nebraska Avenue, Peoria, IL 61604, 309-673-2131

B. Hanson Professional Services, Inc., 7625 N University Street Suite 200, Peoria, IL 61614, 309-691-0902

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.

2. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

SECTION 014200 - REFERENCES

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 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."

B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. AABC - Associated Air Balance Council; www.aabc.com.
2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
3. AAPFCO - Association of American Plant Food Control Officials; www.aapfco.org.
4. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
5. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
6. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
7. ABMA - American Boiler Manufacturers Association; www.abma.com.
8. ACI - American Concrete Institute; (Formerly: ACI International); www.abma.com.
9. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
10. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
11. AF&PA - American Forest & Paper Association; www.afandpa.org.
12. AGA - American Gas Association; www.aga.org.
13. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
14. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
15. AI - Asphalt Institute; www.asphaltinstitute.org.
16. AIA - American Institute of Architects (The); www.aia.org.
17. AISC - American Institute of Steel Construction; www.aisc.org.
18. AISI - American Iron and Steel Institute; www.steel.org.
19. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
20. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
21. ANSI - American National Standards Institute; www.ansi.org.
22. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
23. APA - APA - The Engineered Wood Association; www.apawood.org.
24. APA - Architectural Precast Association; www.archprecast.org.
25. API - American Petroleum Institute; www.api.org.
26. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
27. ARI - American Refrigeration Institute; (See AHRI).

28. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
29. ASCE - American Society of Civil Engineers; www.asce.org.
30. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
31. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
32. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
33. ASSE - American Society of Safety Engineers (The); www.asse.org.
34. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
35. ASTM - ASTM International; www.astm.org.
36. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
37. AWEA - American Wind Energy Association; www.awea.org.
38. AWI - Architectural Woodwork Institute; www.awinet.org.
39. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
40. AWPA - American Wood Protection Association; www.awpa.com.
41. AWS - American Welding Society; www.aws.org.
42. AWWA - American Water Works Association; www.awwa.org.
43. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
44. BIA - Brick Industry Association (The); www.gobrick.com.
45. BICSI - BICSI, Inc.; www.bicsi.org.
46. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.org.
47. BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.
48. BWF - Badminton World Federation; (Formerly: International Badminton Federation); www.bissc.org.
49. CDA - Copper Development Association; www.copper.org.
50. CEA - Canadian Electricity Association; www.electricity.ca.
51. CEA - Consumer Electronics Association; www.ce.org.
52. CFFA - Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
53. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
54. CGA - Compressed Gas Association; www.cganet.com.
55. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
56. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
57. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
58. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
59. CPA - Composite Panel Association; www.pbmdf.com.
60. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
61. CRRC - Cool Roof Rating Council; www.coolroofs.org.
62. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
63. CSA - Canadian Standards Association; www.csa.ca.
64. CSA - CSA International; (Formerly: IAS - International Approval Services); www.csa-international.org.
65. CSI - Construction Specifications Institute (The); www.csinet.org.
66. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
67. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
68. CWC - Composite Wood Council; (See CPA).
69. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
70. DHI - Door and Hardware Institute; www.dhi.org.
71. ECA - Electronic Components Association; (See ECIA).

72. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
73. ECIA - Electronic Components Industry Association; www.eciaonline.org.
74. EIA - Electronic Industries Alliance; (See TIA).
75. EIMA - EIFS Industry Members Association; www.eima.com.
76. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
77. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org.
78. ESTA - Entertainment Services and Technology Association; (See PLASA).
79. EVO - Efficiency Valuation Organization; www.evo-world.org.
80. FCI - Fluid Controls Institute; www.fluidcontrolsinstitute.org.
81. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
82. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
83. FM Approvals - FM Approvals LLC; www.fmglobal.com.
84. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
85. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; www.floridaroof.com.
86. FSA - Fluid Sealing Association; www.fluidsealing.com.
87. FSC - Forest Stewardship Council U.S.; www.fscus.org.
88. GA - Gypsum Association; www.gypsum.org.
89. GANA - Glass Association of North America; www.glasswebsite.com.
90. GS - Green Seal; www.greenseal.org.
91. HI - Hydraulic Institute; www.pumps.org.
92. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
93. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
94. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
95. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
96. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
97. IAS - International Accreditation Service; www.iasonline.org.
98. IAS - International Approval Services; (See CSA).
99. ICBO - International Conference of Building Officials; (See ICC).
100. ICC - International Code Council; www.iccsafe.org.
101. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
102. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
103. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
104. IEC - International Electrotechnical Commission; www.iec.ch.
105. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
106. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
107. IESNA - Illuminating Engineering Society of North America; (See IES).
108. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
109. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
110. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
111. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
112. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
113. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
114. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).

115. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
116. ISO - International Organization for Standardization; www.iso.org.
117. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
118. ITU - International Telecommunication Union; www.itu.int/home.
119. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
120. LMA - Laminating Materials Association; (See CPA).
121. LPI - Lightning Protection Institute; www.lightning.org.
122. MBMA - Metal Building Manufacturers Association; www.mbma.com.
123. MCA - Metal Construction Association; www.metalconstruction.org.
124. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
125. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
126. MHIA - Material Handling Industry of America; www.mhia.org.
127. MIA - Marble Institute of America; www.marble-institute.com.
128. MMPA - Moulding & Millwork Producers Association; www.wmmpa.com.
129. MPI - Master Painters Institute; www.paintinfo.com.
130. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
131. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
132. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
133. NADCA - National Air Duct Cleaners Association; www.nadca.com.
134. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
135. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
136. NBI - New Buildings Institute; www.newbuildings.org.
137. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
138. NCMA - National Concrete Masonry Association; www.ncma.org.
139. NEBB - National Environmental Balancing Bureau; www.nebb.org.
140. NECA - National Electrical Contractors Association; www.necanet.org.
141. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
142. NEMA - National Electrical Manufacturers Association; www.nema.org.
143. NETA - InterNational Electrical Testing Association; www.netaworld.org.
144. NFHS - National Federation of State High School Associations; www.nfhs.org.
145. NFPA - National Fire Protection Association; www.nfpa.org.
146. NFPA - NFPA International; (See NFPA).
147. NFRC - National Fenestration Rating Council; www.nfrc.org.
148. NHLA - National Hardwood Lumber Association; www.nhla.com.
149. NLGA - National Lumber Grades Authority; www.nlga.org.
150. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
151. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
152. NRCA - National Roofing Contractors Association; www.nrca.net.
153. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
154. NSF - NSF International; www.nsf.org.
155. NSPE - National Society of Professional Engineers; www.nspe.org.
156. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
157. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
158. NWFA - National Wood Flooring Association; www.nwfa.org.
159. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
160. PDI - Plumbing & Drainage Institute; www.pdionline.org.

161. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); www.plasa.org.
162. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
163. RFCI - Resilient Floor Covering Institute; www.rfci.com.
164. RIS - Redwood Inspection Service; www.redwoodinspection.com.
165. SAE - SAE International; www.sae.org.
166. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
167. SDI - Steel Deck Institute; www.sdi.org.
168. SDI - Steel Door Institute; www.steeldoor.org.
169. SEFA - Scientific Equipment and Furniture Association (The); www.sefalabs.com.
170. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
171. SIA - Security Industry Association; www.siaonline.org.
172. SJI - Steel Joist Institute; www.steeljoist.org.
173. SMA - Screen Manufacturers Association; www.smainfo.org.
174. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
175. SMPTE - Society of Motion Picture and Television Engineers; www.smpte.org.
176. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
177. SPIB - Southern Pine Inspection Bureau; www.spib.org.
178. SPRI - Single Ply Roofing Industry; www.spri.org.
179. SRCC - Solar Rating & Certification Corporation; www.solar-rating.org.
180. SSINA - Specialty Steel Industry of North America; www.ssina.com.
181. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
182. STI - Steel Tank Institute; www.steeltank.com.
183. SWI - Steel Window Institute; www.steelwindows.com.
184. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
185. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
186. TCNA - Tile Council of North America, Inc.; www.tileusa.com.
187. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
188. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
189. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
190. TMS - The Masonry Society; www.masonrysociety.org.
191. TPI - Truss Plate Institute; www.tpinst.org.
192. TPI - Turfgrass Producers International; www.turfgrasssod.org.
193. TRI - Tile Roofing Institute; www.tileroofing.org.
194. UL - Underwriters Laboratories Inc.; www.ul.com.
195. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
196. USAV - USA Volleyball; www.usavolleyball.org.
197. USGBC - U.S. Green Building Council; www.usgbc.org.
198. USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.
199. WASTEC - Waste Equipment Technology Association; www.wastec.org.
200. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
201. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
202. WDMA - Window & Door Manufacturers Association; www.wdma.com.
203. WI - Woodwork Institute; www.wicnet.org.
204. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
205. WWPA - Western Wood Products Association; www.wwpa.org.

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.

1. DIN - Deutsches Institut fur Normung e.V.; www.din.de.
2. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
3. ICC - International Code Council; www.iccsafe.org.
4. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.

1. COE - Army Corps of Engineers; www.usace.army.mil.
2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
4. DOD - Department of Defense; www.quicksearch.dla.mil.
5. DOE - Department of Energy; www.energy.gov.
6. EPA - Environmental Protection Agency; www.epa.gov.
7. FAA - Federal Aviation Administration; www.faa.gov.
8. FG - Federal Government Publications; www.gpo.gov.
9. GSA - General Services Administration; www.gsa.gov.
10. HUD - Department of Housing and Urban Development; www.hud.gov.
11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; www.eetd.lbl.gov.
12. OSHA - Occupational Safety & Health Administration; www.osha.gov.
13. SD - Department of State; www.state.gov.
14. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; www.trb.org.
15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
16. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
17. USDJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
18. USP - U.S. Pharmacopeial Convention; www.usp.org.
19. USPS - United States Postal Service; www.usps.com.

E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
2. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.quicksearch.dla.mil.
3. DSCC - Defense Supply Center Columbus; (See FS).
4. FED-STD - Federal Standard; (See FS).

5. FS - Federal Specification; Available from DLA Document Services; www.quicksearch.dla.mil.

    a. Available from Defense Standardization Program; www.dsp.dla.mil.
    b. Available from General Services Administration; www.gsa.gov.
    c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.

6. MILSPEC - Military Specification and Standards; (See DOD).
7. USAB - United States Access Board; www.access-board.gov.
8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

F. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
2. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.calregs.com.
3. CDHS; California Department of Health Services; (See CDPH).
4. CDPH; California Department of Public Health; Indoor Air Quality Program; www.cal-iaq.org.
5. CPUC; California Public Utilities Commission; www.cpuc.ca.gov.
6. SCAQMD; South Coast Air Quality Management District; www.aqmd.gov.
7. TFS; Texas A&M Forest Service; Sustainable Forestry and Economic Development; www.txforestservice.tamu.edu.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

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. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:

1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.

1.3 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited testing agencies, and authorities having jurisdiction.

B. Water Service: Arrange with City to use water from hydrants and pay water-service use charges for water used by all entities for construction operations. Water for irrigation will be from existing irrigation system for which the Owner will continue to pay water charges.

C. Electric Power Service: Provide temporary electric service and pay electric-power-service use charges for electricity used by all entities for construction operations.

1.4 INFORMATIONAL SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

C. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.

1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.

2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
3. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.

1.5 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

C. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.6 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide new materials. Undamaged, previously used materials in serviceable condition may be used if approved by Owner’s Representative.

B. Materials: As described in Plans and Specifications.

C. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

D. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

1. Store combustible materials apart from building.

2.2 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: If sewage is generated, provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.

C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

F. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

B. Temporary Use of Permanent Roads (alleyways) and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

C. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

D. Parking: Use designated areas of Owner's existing parking areas for construction personnel.

E. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

F. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Identification Signs: Provide Project identification signs as indicated on Drawings.
2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.

    a. Provide temporary, directional signs for construction personnel and visitors.

3. Maintain and touchup signs so they are legible at all times.

G. Waste Disposal Facilities: Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

H. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."

I. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

J. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.

K. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.

1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.

L. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

1. Comply with work restrictions specified in Section 011000 "Summary."

C. Temporary Erosion and Sedimentation Control: Comply with requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

D. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings, requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

E. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

F. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

G. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

H. Comply with regulations of authorities having jurisdiction and requirements indicated on Drawings.

I. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.

3.5 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION

SECTION 016000 - PRODUCT REQUIREMENTS

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. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Requirements:

1. Section 014200 "References" for applicable industry standards for products specified.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.4 ACTION SUBMITTALS

A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
2. Owner's Representative Action: If necessary, Owner's Representative will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Contractor will be notified of approval or rejection of proposed comparable product request within fifteen (15) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.

    a. Form of Approval: As specified in Section 013300 "Submittal Procedures."
    b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.

4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
3. Products:

    a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
    b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.

4. Manufacturers:

    a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.
    b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.

5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics

that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

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. Section includes administrative and procedural requirements for the following:

1. Recycling nonhazardous demolition waste.
2. Disposing of nonhazardous demolition waste.

1.3 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

1.4 PERFORMANCE REQUIREMENTS

A. General: Dispose of waste lawfully and, if determined feasible by the Contractor, recycle material. Retain "Demolition Waste" and "Construction Waste" subparagraphs below with last option in "General" Paragraph above to suit Project. Subparagraphs are examples of the most common demolition and construction waste that can be salvaged or recycled; revise list or insert other types of waste to suit Project; verify capabilities of local recycling facilities.

1. Demolition Waste includes:

a. Asphalt paving.
b. Concrete.
c. Concrete reinforcing steel.
d. Brick.

e. Concrete masonry units.
f. Other materials

2. Construction Waste includes:
a. Masonry and CMU.
b. Concrete and asphalt.
c. Electrical materials
d. Piping and plumbing materials.
e. Other materials.

1.5 ACTION SUBMITTALS

A. Waste Management Plan: Submit plan within seven (7) days of date established for commencement of work.

1.6 INFORMATIONAL SUBMITTALS

A. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

B. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

1.7 WASTE MANAGEMENT PLAN

A. General: Develop a waste management plan according to ASTM E 1609 and requirements in this Section. Plan shall consist of waste identification, intention for recycling or disposal, and facilities to accept the materials.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

1. Comply with operation, termination, and removal requirements in Section 015000 "Temporary Facilities and Controls."

B. Waste Management Coordinator: Designate a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.

C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.

1. Distribute waste management plan to everyone concerned within three (3) days of submittal return.
2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
2. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

E. Waste Management in Historic Zones or Areas: Hauling equipment and other materials shall be of sizes that clear surfaces within historic spaces, areas, and openings.

3.2 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

B. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.

1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

    a. Inspect containers and bins for contamination and remove contaminated materials if found.

2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

3.3 RECYCLING DEMOLITION WASTE

A. Asphalt Paving: Break up and transport paving to asphalt-recycling facility.

B. Concrete: Break up and transport paving to asphalt-recycling facility

3.4 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION

SECTION 017700 - CLOSEOUT PROCEDURES

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. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.
5. Repair of the Work.

B. Related Requirements:

1. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.
2. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
3. Section 017900 "Demonstration and Training" for requirements for instructing Owner's personnel.

1.3 ACTION SUBMITTALS

A. Product Data: For cleaning agents.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.4 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

C. Field Report: For pest control inspection.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.6 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of ten (10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Owner’s Representative. Label with manufacturer's name and model number where applicable.
5. Retain "Schedule of Maintenance Material Items" Subparagraph below when documentation of maintenance material item submittal is required for Project.
6. Submit test/adjust/balance records.
7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of ten (10) days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
6. Advise Owner of changeover in heat and other utilities.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders as needed.

8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements, including touchup painting.
10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of ten (10) days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Owner's Representative will either proceed with inspection or notify Contractor of unfulfilled requirements. Owner's Representative will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.7 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Owner's Representative. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Owner's Representative will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Submit three (3) copies of list. Include name and identification of each area affected by incomplete items, and items needing correction including any areas outside the limits of construction.

1. Organize list of spaces in sequential order by space affected.

1.9 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Owner's Representative for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Partial Occupancy: Submit properly executed warranties within fifteen (15) days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.

e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
g. Sweep paved surfaces.
h. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
i. Leave Project clean and ready for occupancy.

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

    a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION

SECTION 017823 - OPERATION AND MAINTENANCE DATA

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. Section requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Operation manuals for systems, subsystems, and equipment.
3. Product maintenance manuals.
4. Systems and equipment maintenance manuals.

B. Related Requirements:

1. Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
2. Section 019113 "General Commissioning Requirements" for verification and compilation of data into operation and maintenance manuals.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Owner’s Representative will comment on whether content of operations and maintenance submittals are acceptable.
2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operations and maintenance manuals in the following format:

1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.

    a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
    b. Enable inserted reviewer comments on draft submittals.

2. Three (3) paper copies. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Owner's Representative will return two (2) copies.

C. Initial Manual Submittal: Submit draft copy of each manual at least thirty (30) days before commencing demonstration and training. Owner's Representative will comment on whether general scope and content of manual are acceptable.

D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least fifteen (15) days before commencing demonstration and training. Owner's Representative will return copy with comments.

1. Correct or revise each manual and submit copies of each corrected manual within fifteen (15) days and prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DIRECTORY

A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:

1. List of documents.
2. List of systems.
3. List of equipment.
4. Table of contents.

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to

ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 OPERATION AND MAINTENANCE MANUALS

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Owner's Representative.
7. Name and contact information for Consultants and Subconsultants.
8. Name and contact information for Commissioning Authority.
9. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

F. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.

1. Binders: Heavy-duty, three-ring, vinyl-covered, loose leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

    a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
    b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

    a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
    b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

G. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections.

2.3 PRODUCT MAINTENANCE MANUALS

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.

3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

2.4 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.

6. Demonstration and training video recording, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.

B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format,

identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of operation and maintenance manuals.
2. Comply with requirements of newly prepared record Drawings in Section 017839 "Project Record Documents."

G. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION

SECTION 017839 - PROJECT RECORD DOCUMENTS

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. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.
4. Miscellaneous record submittals.

B. Related Requirements:

1. Section 017700 "Closeout Procedures" for general closeout procedures.
2. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit one (1) set of marked-up record prints.
2. Number of Copies: Submit copies of record Drawings as follows:

a. Initial Submittal:

1) Submit one (1) set of marked-up paper record prints.
2) Submit PDF electronic files of scanned record prints and one (1) set of file prints.
3) Submit record digital data files and one (1) set of plots.
4) Owner’s Representative will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.

b. Final Submittal:

1) Submit one (1) paper-copy set of marked-up record prints.
2) Submit record digital data files and three (3) sets of record digital data file plots.

3) Plot each drawing file, whether or not changes and additional information were recorded.

B. Record Specifications: Submit one paper copy and one annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit one paper copy and one annotated PDF electronic files of each submittal.

1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit one paper copy and one annotated PDF electronic files.

E. Reports: Submit written report monthly indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an acceptable drawing technique.
c. Record data as soon as possible after obtaining it.
d. Record and check the markup before enclosing concealed installations.
e. Cross-reference record prints to corresponding archive photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:

a. Dimensional changes to Drawings.
b. Revisions to details shown on Drawings.
c. Depths of foundations below first floor.
d. Locations and depths of underground utilities.
e. Revisions to routing of piping and conduits.
f. Revisions to electrical circuitry.
g. Actual equipment locations.

h. Duct size and routing.
i. Locations of concealed internal utilities.
j. Changes made by Change Order or Change Directive.
k. Changes made following one paper copy and one annotated PDF electronic files written orders.
l. Details not on the original Contract Drawings.
m. Field records for variable and concealed conditions.
n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with one paper copy and one annotated PDF electronic files. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:

1. Format: Same digital data software program, version, and operating system as the original Contract Drawings.
2. Format: DWG Version 2017 Windows operating system.
3. Format: Annotated PDF electronic file.
4. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
5. Refer instances of uncertainty to Owner's Representative for resolution.
6. Owner's Representative will furnish Contractor one set of digital data files of the Contract Drawings for use in recording information.

a. See Section 013300 "Submittal Procedures" for requirements related to use of Architect's digital data files.
b. Owner's Representative will provide data file layer information. Record markups in separate layers.

C. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing record Drawings where Owner's Representative determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.

1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
2. Consult Owner's Representative for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared record Drawings into record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.

D. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Format: Annotated PDF electronic file.
3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
4. Identification: As follows:

a. Project name.
b. Date.
c. Designation "PROJECT RECORD DRAWINGS."
d. Name of Owner's Representative.
e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
5. Note related Change Orders and record Drawings where applicable.

B. Format: Submit record Specifications as annotated PDF electronic file.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, record Specifications, and record Drawings where applicable.

B. Format: Submit record Product Data as annotated PDF electronic file.

1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as PDF electronic file.

1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Maintenance of Record Documents and Samples: Store record documents and Samples in a designated location apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Owner's Representative reference during normal working hours.

END OF SECTION

SECTION 017900 - DEMONSTRATION AND TRAINING

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. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Demonstration of operation of systems, subsystems, and equipment.
2. Training in operation and maintenance of systems, subsystems, and equipment.
3. Demonstration and training video recordings.

1.3 INFORMATIONAL SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

B. Qualification Data: For trainer.

C. Attendance Record: For each training module, submit list of participants and length of instruction time.

D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.4 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit two (2) copies within seven (7) days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:

a. Name of Project.
b. Name and address of videographer.

c. Name of Owner's Representative
d. Name of Construction Manager.
e. Name of Contractor.
f. Date of video recording.

2. Transcript: Prepared and bound in format matching operation and maintenance manuals. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding video recording. Include name of Project and date of video recording on each page.
3. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
4. At completion of training, submit complete training manual(s) for Owner's use prepared and bound in format matching operation and maintenance manuals and in PDF electronic file format on compact disc.

1.5 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.

C. Videographer Qualifications: A professional videographer who is experienced photographing demonstration and training events similar to those required.

D. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:

1. Inspect and discuss locations and other facilities required for instruction.
2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
3. Review required content of instruction.
4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.6 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

    a. System, subsystem, and equipment descriptions.
    b. Performance and design criteria if Contractor is delegated design responsibility.
    c. Operating standards.
    d. Regulatory requirements.
    e. Equipment function.
    f. Operating characteristics.
    g. Limiting conditions.
    h. Performance curves.

2. Documentation: Review the following items in detail:

    a. Emergency manuals.
    b. Operations manuals.
    c. Maintenance manuals.
    d. Project record documents.
    e. Identification systems.
    f. Warranties and bonds.
    g. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:

    a. Instructions on meaning of warnings, trouble indications, and error messages.
    b. Instructions on stopping.
    c. Shutdown instructions for each type of emergency.
    d. Operating instructions for conditions outside of normal operating limits.
    e. Sequences for electric or electronic systems.
    f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

a. Startup procedures.
b. Equipment or system break-in procedures.
c. Routine and normal operating instructions.
d. Regulation and control procedures.
e. Control sequences.
f. Safety procedures.
g. Instructions on stopping.
h. Normal shutdown instructions.
i. Operating procedures for emergencies.
j. Operating procedures for system, subsystem, or equipment failure.
k. Seasonal and weekend operating instructions.
l. Required sequences for electric or electronic systems.
m. Special operating instructions and procedures.

5. Adjustments: Include the following:

a. Alignments.
b. Checking adjustments.
c. Noise and vibration adjustments.
d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

a. Diagnostic instructions.
b. Test and inspection procedures.

7. Maintenance: Include the following:

a. Inspection procedures.
b. Types of cleaning agents to be used and methods of cleaning.
c. List of cleaning agents and methods of cleaning detrimental to product.
d. Procedures for routine cleaning
e. Procedures for preventive maintenance.
f. Procedures for routine maintenance.
g. Instruction on use of special tools.

8. Repairs: Include the following:

a. Diagnosis instructions.
b. Repair instructions.
c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
d. Instructions for identifying parts and components.
e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."

B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Architect will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
2. Owner will furnish an instructor to describe Owner's operational philosophy.
3. Owner will furnish Contractor with names and positions of participants.

C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner’s Representative with at least seven (7) days' advance notice.

D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.

F. Cleanup: Collect used and leftover educational materials and remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. General: Allow Owner to video record demonstration sessions and cooperate fully if they choose to do so.

END OF SECTION

SECTION 12 90 00 – SITE FURNISHINGS

PART 1 – GENERAL

1.1 WORK INCLUDES

A. Base Bid

1. General Contractor provide and install

   a. Benches
   b. Bollards – retractable
   c. Flagpoles
   d. Bicycle Racks
   e. Trash Receptacles
   f. Planters
   g. Sculpture - relocation

2. Warranty

1.2 RELATED SECTIONS

A. Specified elsewhere

1. All related exterior improvement work.

1.3 QUALITY ASSURANCE

A. All work described in this Section is to be done by a firm specializing in such work with documented 5 years experience construction of similar structures. The personnel of the firm shall be experienced in the work specified and shall work under the direction of a skilled foreman.

1.4 SUBMITTALS

A. Product Data

1. Cut sheets for all site furnishings.
2. Manufacturers' product warranties.

1.5 PROTECTION

A. Contractor is responsible to protect and avoid all existing above ground and underground utilities during construction operations. Repair of any utilities damaged by construction shall be the responsibility of the Contractor.

B. Contractor is responsible to protect all existing conditions including structures, pavements and plant material from damage during project construction. Any damages occurring shall be the responsibility of the Contractor to replace, repair or compensate Owner for damages to the satisfaction of the Owner.

1.6 WARRANTY

A. Contractor provide

1. Warranty products and workmanship for a period of one year.
2. Manufacturers' product warranties.

1.7 REFERENCE DOCUMENTS

A. The Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, adopted April 1, 2016 and all subsequent amendments, referred herein as IDOT Standard Specifications.

PART 2 – PRODUCTS

2.1 PRODUCTS AND MATERIALS

A. Benches

1. Backless bench with cast aluminum frames and aluminum extrusion horizontal slats
2. 75" long x 30" wide seat x 16¼" seat height
3. Black powder coated color
4. Covington Collection, 6' bench without back, Model #C01419C as manufactured by Wabash Valley, Silver Lake, IN 46982, 1-800-253-8619, www.wabashvalley.com
5. 3/8" diameter x 6" long stainless steel anchor bolts (not provided by Wabash Valley)

B. Bollard – retractable

1. High quality 316 grade stainless steel retractable bollard
2. 35-5/8" height x 4½" body diameter, 24 lbs.
3. Polyester powder coated, black color with reflective white tape
4. Bollard R-8471-RA as manufactured by Reliance Foundry, www.reliance-foundry.com, 1-888-735-5680

C. Flagpoles

1. Aluminum tapered poles with stainless steel cable, internal halyard and a removable crank handle, black anodized finish
2. 25' pole: Model #EC25IH, 6" butt diameter, 3-1/2" top diameter, 0.188 wall thickness, in-ground mount
3. Manufactured or supplied by one of the following

   a. ID Signs, 3555 Ogden Road, Springfield, IL 217-793-2258.
   b. Eder Flag, 1000 W. Rawson Avenue, Oak Creek, WI 53154 www.ederflag.com

4. Parts for flagpole installations

a. Corrugated steel tube foundation sleeve
b. Support plate
c. Grounding spike
d. Waterproof compound
e. Sand in accordance with Section 1003 – Fine Aggregates.
f. Concrete for footings to be in accordance with Section 1020 Portland Cement Concrete, Type SI
g. Reinforcement in accordance with Section 1006.10 Concrete Reinforcement Bars, Fabric, and Strand

D. Bicycle Rack

1. 2-3/8" steel tubing bicycle rack
2. 34" high x 30" wide
3. Surface Gusset Mount with ½" diameter x 6" long stainless steel anchor bolts
4. Black powder coated finish
5. "UX" bike rack as manufactured by Madrax, 1080 Uniek Drive, Waunakee, WI 53597 www.madrax.com or approved equal

E. Trash Receptacles

1. 32 gallon slat style trash receptacle
2. 49½" tall x 32" top diameter
3. Black powder coated color
4. Side opening door, solid bonnet lid, and surface mounted
5. Urbanscape – "J" style 32 gallon receptacle with liner, Model #TJ3B43S as manufactured by Wabash Valley, Silver Lake, IN 46982, 1-800-253-8619, www.wabashvalley.com
6. 3/8" diameter x 6" long stainless steel anchor bolts (not provided by Wabash Valley)

F. Planters

1. Rectangular, self-watering resin planter, sandstone finish
2. 55" long x 26" wide x 21" height
3. Water reservoir in the bottom of the planter with perforated tubes to store 8 to 10 inches of water (50.14 gallons) with an overflow drain below soil level
4. Model FP=SW-RT as manufactured by OCC Outdoors, 6925 S. Carroll Road, Indianapolis, IN 46259, 1-800-821-7670. www.occoutdoors.com or approved equal
5. Fill for Planters

a. Filter Fabric: 6 oz. weight non-woven fabric meeting standards of Section 282 – Filter Fabric, IDOT Standard Specifications
b. Potting Soil: Commercial potting soil mix comprised of equal parts of peat moss, rotted cow or horse manure and vermiculite and enhanced with fertilizer, forming a good growth medium for flowers

G. Sculpture Relocation

1. Existing sculpture as indicated on project plans.

H. Concrete according to Section 32 1315 – Special Concrete.

2.2 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, and handle to prevent damage to the products and materials.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Benches

1. Position benches on pavement where shown on plans.
2. Verify position with Owner's Representative.
3. Secure to pavement with stainless steel anchor bolts as shown on project plans.

B. Bollards – retractable

1. Excavate area for bollards.
2. Place aggregate in bottom of excavation to depth indicated on project plans.
3. Place the bollard receiver directly on aggregate base and align deadbolt housings so bollard orientation is consistent. Top of receiver to be 3/8" above finished grade.
4. Extend the bollard and protect with plastic secured with bands to avoid concrete splatter or other damage.
5. Fill aggregate around the base of the receiver.
6. Pour concrete base as indicated on project plans, sloping top surface away from receiver.
7. Check bollard alignment to insure it is plumb and level while concrete cures.

C. Flagpoles

1. Set corrugated steel tube foundation sleeve into concrete footing.
2. Weld lightning grounding spike to the support plate.
3. Install footing according to Section 32 0523 – Cement and Concrete for Exterior Improvements and project plans.
4. Fit flagpole into foundation sleeve and secure to foundation support plate.
5. Set flagpole straight and plumb.
6. Fill void between flagpole and sleeve with sand and thoroughly tamp.
7. Install waterproof compound on top of sand base, 2" deep minimum.

D. Bicycle Rack

1. Position bicycle racks on pavement where shown on plans.
2. Verify position with Owner's Representative.
3. Secure to pavement with stainless steel anchor bolts according to manufacturer's instructions and project details.

E. Trash Receptacles

1. Position receptacles on pavement where shown on plans.
2. Verify position with Owner's Representative.
3. Secure to pavement with stainless steel anchor bolts as shown on project plans.

F. Planters

1. Position planters on pavement where shown on plans.
2. Fill planters

    a. Cover bottom of planter with filter fabric
    b. Place potting soil over filter fabric and firmly tamp to the level shown on plans.
    c. Planting will be done by others.

G. Sculpture Relocation

1. Carefully remove existing sculpture during construction operations.
2. Store sculpture off-site at the Armory Building, 149 N. Broad Street, Galesburg, IL in a secure place and protect from damage.
3. Reinstall sculpture after plaza improvements are complete. See below for installation method.

    a. Note attachment method during removal.
    b. Position sculpture on concrete pavement where shown on plans.
    c. Verify position with Owner's Representative.
    d. Secure to pavement using the same method previously used to secure sculpture.

3.2 REPAIR

A. Repair any scuffing or other surface marring to the satisfaction of the Owner's Representative.

3.3 CLEAN-UP

A. Leave site clean and free of debris. Repair any damage to the satisfaction of the Owner's Representative.

END OF SECTION

SECTION 22 05 17 – SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Plumbing Contractor Provide. Base Bid and Alternate Bid.

1. Sleeves.
2. Grout.
3. Silicone sealants.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 SLEEVES

A. Galvanized-Steel Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

B. PVC Pipe Sleeves: ASTM D 1785, Schedule 40.

2.2 GROUT

A. Description: Non-shrink, for interior and exterior sealing openings in non-fire-rated walls or floors.

B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

C. Design Mix: 5000-psi, 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

2.3 SILICONE SEALANTS

A. Silicone, S, NS, 25, NT: Single-component, non-sag, plus 25 percent and minus 25 percent movement capability, non-traffic-use, neutral-curing silicone joint sealant, ASTM C 920, Type S, Grade NS, Class 25, Use NT.

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

a. Dow Corning Corporation.
b. GE Construction Sealants; Momentive Performance Materials Inc.
c. Polymeric Systems, Inc.
d. Schnee-Morehead, Inc., an ITW company.

e. Sherwin-Williams Company (The).

B. Silicone, S, P, 25, T, NT: Single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and non-traffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade P, Class 25, Uses T and NT. Grade P Pourable (self-leveling) formulation is for opening in floors and other horizontal surfaces that are not fire rated.

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

a. May National Associates, Inc.; a subsidiary of Sika Corporation.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION

A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.

B. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.

1. Cut sleeves to length for mounting flush with both surfaces.

a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.

2. Using grout or silicone sealant, seal the space outside of sleeves in slabs and walls without sleeve-seal system.

C. Install sleeves for pipes passing through interior partitions.

1. Cut sleeves to length for mounting flush with both surfaces.
2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint.

D. Fire-Resistance-Rated Penetrations, Horizontal Assembly Penetrations, and Smoke Barrier Penetrations: Maintain indicated fire or smoke rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with fire- and smoke-stop materials. Comply with requirements for fire*stopping and fill materials specified in Section 078413 "Penetration Firestopping."

3.2 SLEEVE AND SLEEVE-SEAL SCHEDULE

A. Use sleeves and sleeve seals for the following piping-penetration applications:

1. Exterior Concrete Walls above Grade:

a. Piping: Schedule 40 PVC.

2. Exterior Concrete Walls below Grade:

    a. Piping: Schedule 40 PVC

        1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.

3. Concrete Slabs-on-Grade:

    a. Piping: Schedule 40 PVC.

        1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.

4. Concrete Slabs above Grade:

    a. Piping: Steel pipe sleeves or PVC pipe sleeves.

5. Interior Partitions:

    a. Piping: Steel pipe sleeves or PVC pipe sleeves.

END OF SECTION

SECTION 22 05 18 – ESCUTCHEONS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Plumbing Contractor Provide. Base Bid and Alternate Bid.

1. Escutcheons.
2. Floor plates.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. BrassCraft Manufacturing Co.; a Masco company.
2. Dearborn Brass.
3. Jones Stephens Corp.
4. Keeney Manufacturing Company (The).
5. Mid-America Fittings, Inc.
6. ProFlo; a Ferguson Enterprises, Inc. brand.

2.2 ESCUTCHEONS

A. One-Piece, Steel Type: With polished, chrome-plated finish and setscrew fastener.

B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped steel with polished, chrome-plated finish and spring-clip fasteners.

C. One-Piece, Stamped-Steel Type: With polished, chrome-plated finish and spring-clip fasteners.

D. Split-Plate, Stamped-Steel Type: With polished, chrome-plated finish; hinge; and spring-clip fasteners.

2.3 FLOOR PLATES

A. Split Floor Plates: Cast brass with concealed hinge.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.

B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of insulated piping and with OD that completely covers opening.

1. Escutcheons for New Piping:

a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep pattern.
b. Chrome-Plated Piping: One-piece steel with polished, chrome-plated finish.
c. Insulated Piping: One-piece stamped steel or split-plate, stamped steel with concealed hinge with polished, chrome-plated finish.
d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece steel with polished, chrome-plated finish.
e. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece steel with polished, chrome-plated finish.

C. Install floor plates for piping penetrations of equipment-room floors.

D. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.

1. New Piping: Split floor plate.

3.2 FIELD QUALITY CONTROL

A. Using new materials, replace broken and damaged escutcheons and floor plates.

END OF SECTION

SECTION 22 05 23.12 – BALL VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Plumbing Contractor Provide. Base Bid and Alternate Bid.

1. Brass ball valves.
2. Bronze ball valves.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of valve.

1. Certification that products comply with NSF 61 Annex G.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.

B. ASME Compliance:

1. ASME B1.20.1 for threads for threaded end valves.
2. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
3. ASME B16.18 for solder-joint connections.
4. ASME B31.9 for building services piping valves.

C. NSF Compliance: NSF 61 Annex G for valve materials for potable-water service.

D. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.

E. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

F. Valve Sizes: Same as upstream piping unless otherwise indicated.

G. Valve Actuator Types:
1. Hand-lever: For quarter-turn valves smaller than NPS 4.

H. Valves in Insulated Piping:

1. Include 2-inch stem extensions.
2. Extended operating handles of non-thermal-conductive material and protective sleeves that allow operation of valves without breaking vapor seals or disturbing insulation.
3. Memory stops that are fully adjustable after insulation is applied.

2.2 BRASS BALL VALVES

A. Brass Ball Valves, Two-Piece with Full Port and Brass Trim:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Hammond Valve.
   b. Milwaukee Valve Company.
   c. NIBCO INC.
   d. Stockham; Crane Energy Flow Solutions.

2.3 BRONZE BALL VALVES

A. Bronze Ball Valves, Two-Piece with Full Port, and Bronze or Brass Trim:

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

   a. Apollo Valves; Conbraco Industries, Inc.
   b. Hammond Valve.
   c. Lance Valves.
   d. Milwaukee Valve Company.
   e. NIBCO INC.
   f. WATTS.

2. Description:

   a. Standard: MSS SP-110.
   b. CWP Rating: 600 psig.
   c. Body Design: Two piece.
   d. Body Material: Bronze.
   e. Ends: Threaded and soldered.
   f. Seats: PTFE.
   g. Stem: Bronze or brass.
   h. Ball: Chrome-plated brass.
   i. Port: Full.

PART 3 - EXECUTION

3.1 VALVE INSTALLATION

A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

B. Locate valves for easy access and provide separate support where necessary.

C. Install valves in horizontal piping with stem at or above center of pipe.

D. Install valves in position to allow full stem movement.

3.2 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

A. If valves with specified CWP ratings are unavailable, the same types of valves with higher CWP ratings may be substituted.

B. Select valves with the following end connections:

1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.
2. For Steel Piping, NPS 2 and Smaller: Threaded ends.

3.3 DOMESTIC HOT- AND COLD-WATER VALVE SCHEDULE

A. Pipe NPS 2 and Smaller:

1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
2. Bronze ball valves, two-piece with full port and bronze or brass trim.

B. Pipe NPS 2-1/2 and Larger:

1. Bronze or Brass Valves.

END OF SECTION

SECTION 22 05 29 – HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Plumbing Contractor Provide. Base Bid and Alternate Bid.

1. Metal pipe hangers and supports.
2. Trapeze pipe hangers.
3. Thermal-hanger shield inserts.
4. Fastener systems.
5. Pipe positioning systems.
6. Equipment supports.

1.2 ACTION SUBMITTALS

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

1.3 QUALITY ASSURANCE

A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code – Steel."

B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

PART 2 - PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS

A. Carbon-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

2.2 TRAPEZE PIPE HANGERS

A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.3 THERMAL-HANGER SHIELD INSERTS

A. Insulation-Insert Material for Hot and Cold Piping: ASTM C 552, Type II cellular glass with 100-psig or ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength and vapor barrier.

B. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.

C. For Clevis Hangers: Insert and shield shall cover lower 180 degrees of pipe.

D. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.4 FASTENER SYSTEMS

A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

B. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

2.5 PIPE POSITIONING SYSTEMS

A. Description: IAPMO PS 42, positioning system of metal brackets, clips, and straps for positioning piping in pipe spaces; for plumbing fixtures in commercial applications.

2.6 EQUIPMENT SUPPORTS

A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.7 MISCELLANEOUS MATERIALS

A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.

B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.

1. Properties: Nonstaining, noncorrosive, and nongaseous.
2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.

B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.

1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.

C. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.

D. Fastener System Installation:

1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

E. Pipe Positioning-System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture.

F. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

G. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

H. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

I. Install lateral bracing with pipe hangers and supports to prevent swaying.

J. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

K. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

L. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

M. Insulated Piping:

1. Attach clamps and spacers to piping.

   a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
   b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
   c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.

   a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.

3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.

   a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.

4. Shield Dimensions for Pipe: Not less than the following:

   a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
   b. NPS 4: 12 inches long and 0.06 inch thick.
   c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
   d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.

5. Pipes NPS 8 and Larger: Include wood or reinforced calcium-silicate-insulation inserts of length at least as long as protective shield.
6. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.2 EQUIPMENT SUPPORTS

A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.

B. Grouting: Place grout under supports for equipment and make bearing surface smooth.

C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.3 METAL FABRICATIONS

A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.

B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.4 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.5 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.6 HANGER AND SUPPORT SCHEDULE

A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.

B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use carbon-steel pipe hangers and supports and metal trapeze pipe hangers and attachments for general service applications.

F. Use thermal-hanger shield inserts for insulated piping and tubing.

G. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
2. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.
3. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.

H. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.

I. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.

J. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
6. C-Clamps (MSS Type 23): For structural shapes.
7. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:

    a. Light (MSS Type 31): 750 lb.
    b. Medium (MSS Type 32): 1500 lb.
    c. Heavy (MSS Type 33): 3000 lb.

8. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
9. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.

K. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.

L. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.

M. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

N. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

END OF SECTION

SECTION 22 07 19 – PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Plumbing Contractor Provide. Base Bid and Alternate Bid.
Section includes insulating the following plumbing piping services:

1. Domestic hot-water piping.
2. Sanitary waste piping exposed to freezing conditions.
3. Supplies and drains for handicap-accessible lavatories and sinks.

1.2 ACTION SUBMITTALS

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

1.3 QUALITY ASSURANCE

A. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84 by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

B. Comply with the following applicable standards and other requirements specified for miscellaneous components:

1. Supply and Drain Protective Shielding Guards: ICC A117.1.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in "Piping Insulation Schedule, General," and "Indoor Piping Insulation Schedule" articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Mineral-Fiber, Preformed Pipe Insulation:

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

a. Johns Manville; a Berkshire Hathaway company.
b. Knauf Insulation.
c. Manson Insulation Inc.
d. Owens Corning.

2. Type I, 850 Deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

2.2 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.

B. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

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

a. Childers Brand; H. B. Fuller Construction Products.
b. Eagle Bridges - Marathon Industries.
c. Foster Brand; H. B. Fuller Construction Products.
d. Mon-Eco Industries, Inc.

C. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

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

a. Childers Brand; H. B. Fuller Construction Products.
b. Eagle Bridges - Marathon Industries.
c. Foster Brand; H. B. Fuller Construction Products.
d. Mon-Eco Industries, Inc.

2.3 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.

2.4 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

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

a. Avery Dennison Corporation, Specialty Tapes Division.
b. Compac Corporation.
c. Ideal Tape Co., Inc., an American Biltrite Company.
d. Knauf Insulation.

e. Venture Tape.

2. Width: 3 inches.
3. Thickness: 11.5 mils.
4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

2.5 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Pipe Covers,:

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

a. Buckaroos, Inc.
b. Engineered Brass Company.
c. Insul-Tect Products Co.
d. McGuire Manufacturing.
e. Plumberex Specialty Products, Inc.
f. Truebro.
g. Zurn Industries, LLC.

2. Description: Manufactured plastic wraps for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.

B. Protective Shielding Piping Enclosures,:

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

a. Truebro.
b. Zurn Industries, LLC.

2. Description: Manufactured plastic enclosure for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with ADA requirements.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

B. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Keep insulation materials dry during application and finishing.

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

K. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches o.c.

    a. For below-ambient services, apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.

L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

O. For above-ambient services, do not install insulation to the following:

1. Vibration-control devices.
2. Testing agency labels and stamps.
3. Nameplates and data plates.
4. Cleanouts.

3.3 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
7. Stencil or label the outside insulation jacket of each union with the word "union." Match size and color of pipe labels.

3.4 INSTALLATION OF MINERAL-FIBER PREFORMED PIPE INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.5 PIPING INSULATION SCHEDULE, GENERAL

A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

3.6 INDOOR PIPING INSULATION SCHEDULE

A. Domestic Cold and Hot Water: Insulation shall be the following:

1. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

B. Sanitary Vent Piping in attic space:

1. Mineral-fiber, preformed pipe insulation, Type I, 1 inch thick.

END OF SECTION

SECTION 22 11 16 – DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Plumbing Contractor Provide. Base Bid and Alternate Bid.

1. Copper tube and fittings.
2. Piping joining materials.
3. Transition fittings.
4. Dielectric fittings.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

B. Comply with NSF 372 for low lead.

2.2 COPPER TUBE AND FITTINGS

A. Hard Copper Tube: ASTM B 88, Type L water tube, drawn temper.

B. Soft Copper Tube: ASTM B 88, Type K water tube and ASTM B 88, Type L water tube, annealed temper.

C. Cast-Copper, Solder-Joint Fittings: ASME B16.18, pressure fittings.

D. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.

E. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.

F. Copper Unions:

1. MSS SP-123.
2. Cast-copper-alloy, hexagonal-stock body.
3. Ball-and-socket, metal-to-metal seating surfaces.
4. Solder-joint or threaded ends.

G. Copper, Brass, or Bronze Pressure-Seal-Joint Fittings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a.

Apollo Flow Controls; Conbraco Industries, Inc.
b. NIBCO INC.
c. Viega LLC.

2. Fittings: Cast-brass, cast-bronze, or wrought-copper with EPDM O-ring seal in each end. Sizes NPS 2-1/2and larger with stainless steel grip ring and EPDM O-ring seal.
3. Minimum 200-psig working-pressure rating at 250 deg F.

2.3 PIPING JOINING MATERIALS

A. Solder Filler Metals: ASTM B 32, lead-free alloys.

B. Flux: ASTM B 813, water flushable.

C. Brazing Filler Metals: AWS A5.8M/A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

2.4 TRANSITION FITTINGS

A. General Requirements:

1. Same size as pipes to be joined.
2. Pressure rating at least equal to pipes to be joined.
3. End connections compatible with pipes to be joined.

B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.

2.5 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

B. Dielectric Unions:

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

a. A.Y. McDonald Mfg. Co.
b. Capitol Manufacturing Company.
c. Central Plastics Company.
d. HART Industrial Unions, LLC.
e. Jomar Valve.
f. Matco-Norca.
g. WATTS.
h. Wilkins.
i. Zurn Industries, LLC.

2. Standard: ASSE 1079.
3. Pressure Rating: 125 psig minimum at 180 deg F.
4. End Connections: Solder-joint copper alloy and threaded ferrous.

C. Dielectric Flanges:

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

   a. Capitol Manufacturing Company.
   b. Central Plastics Company.
   c. Matco-Norca.
   d. WATTS.
   e. Wilkins.
   f. Zurn Industries, LLC.

2. Standard: ASSE 1079.
3. Factory-fabricated, bolted, companion-flange assembly.
4. Pressure Rating: 125 psig minimum at 180 deg F.
5. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

D. Dielectric Nipples:

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

   a. Elster Perfection Corporation.
   b. Grinnell Mechanical Products.
   c. Matco-Norca.
   d. Precision Plumbing Products.
   e. Victaulic Company.

2. Standard: IAPMO PS 66.
3. Electroplated steel nipple complying with ASTM F 1545.
4. Pressure Rating and Temperature: 300 psig at 225 deg F.
5. End Connections: Male threaded or grooved.
6. Lining: Inert and noncorrosive, propylene.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Comply with requirements in Section 312000 "Earth Moving" for excavating, trenching, and backfilling.

3.2 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."

C. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve inside the building at each domestic water-service entrance.

D. Install shutoff valve immediately upstream of each dielectric fitting.

E. Install domestic water piping level without pitch and plumb.

F. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.

G. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

H. Install piping to allow sufficient space for servicing accessories and coordinate with other services occupying that space.

I. Install piping to permit valve servicing.

J. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.

K. Install piping free of sags and bends.

L. Install fittings for changes in direction and branch connections.

M. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.

N. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

O. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."

3.3 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

D. Brazed Joints for Copper Tubing: Comply with CDA's "Copper Tube Handbook," "Brazed Joints" chapter.

E. Soldered Joints for Copper Tubing: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."

F. Pressure-Sealed Joints for Copper Tubing: Join copper tube and pressure-seal fittings with tools recommended by fitting manufacturer.

G. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.

3.4 TRANSITION FITTING INSTALLATION

A. Install transition couplings at joints of dissimilar piping.

3.5 DIELECTRIC FITTING INSTALLATION

A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.

B. Dielectric Fittings for NPS 2 and Smaller: Use dielectric couplings or nipples.

C. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flanges.

3.6 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements for pipe hanger, support products, and installation in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

1. Vertical Piping: MSS Type 8 or 42, clamps.
2. Individual, Straight, Horizontal Piping Runs:

    a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.

B. Support vertical piping and tubing at base and at each floor.

C. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.

D. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.
2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
3. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
4. NPS 2-1/2: 108 inches with 1/2-inch rod.
5. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.

E. Install supports for vertical copper tubing every 10 feet.

F. Support piping and tubing not listed in this article according to MSS SP-58 and manufacturer's written instructions.

3.7 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.

C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.

D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:

1. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.
2. Equipment: Cold- and hot-water-supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.8 IDENTIFICATION

A. Identify system components. Comply with requirements for identification materials and installation in Section 220553 "Identification for Plumbing Piping and Equipment."

3.9 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Piping Inspections:

a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.

b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:

1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.
2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.

c. Re-inspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for re-inspection.
d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

2. Piping Tests:

a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
d. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
f. Prepare reports for tests and for corrective action required.

B. Domestic water piping will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.10 ADJUSTING

A. Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibbs.
2. Open shutoff valves to fully open position.
3. Open throttling valves to proper setting.
4. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
5. Remove and clean strainer screens. Close drain valves and replace drain plugs.
6. Check plumbing specialties and verify proper settings, adjustments, and operation.
7. Set field-adjustable temperature set points of temperature-actuated, water mixing valves.

3.11 CLEANING

A. Clean and disinfect potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:

a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
b. Fill and isolate system according to either of the following:

1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.

c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
d. Repeat procedures if biological examination shows contamination.
e. Submit water samples in sterile bottles to authorities having jurisdiction.

B. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.

C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.12 PIPING SCHEDULE

A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.

C. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.

D. Under-building-slab, domestic water, building-service piping, NPS 3 and smaller, shall be the following:

1. Copper tube, ASTM B 88, Type K; wrought-copper, solder-joint fittings; copper pressure-seal fittings and brazed joints.

E. Under-building-slab, domestic water piping, NPS 2 and smaller, shall be[one of] the following:

1. Copper tube, ASTM B 88, Type K; one-piece wrought-copper, no joints.

F. Aboveground domestic water piping, NPS 2 and smaller, shall be the following:

1. Hard copper tube, ASTM B 88, Type L; cast- or wrought-copper, solder-joint fittings; and soldered joints.
2. Hard copper tube, ASTM B 88, Type L; copper pressure-seal-joint fittings; and pressure-sealed joints.

G. Aboveground domestic water piping, NPS 2-1/2 to NPS 4, shall be the following:

1. Hard copper tube, ASTM B 88, Type L; cast- or wrought-copper, solder-joint fittings; and brazed joints.
2. Hard copper tube, ASTM B 88, Type L; copper pressure-seal-joint fittings; and pressure-sealed joints.

END OF SECTION

SECTION 22 11 19 – DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Plumbing Contractor Provide. Base Bid and Alternate Bid.

1. Vacuum breakers.
2. Temperature-actuated, water mixing valves.
3. Wall hydrants.
4. Drain valves.
5. Water-hammer arresters.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PIPING SPECIALTIES

A. Potable-water piping and components shall comply with NSF 61 Annex G.

2.2 PERFORMANCE REQUIREMENTS

A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig unless otherwise indicated.

2.3 VACUUM BREAKERS

A. Pipe-Applied, Atmospheric-Type Vacuum Breakers:

1. Standard: ASSE 1001.
2. Size: NPS 1/4 to NPS 3, as required to match connected piping.
3. Body: Bronze.
4. Inlet and Outlet Connections: Threaded.
5. Finish: Rough bronze.

B. Hose-Connection Vacuum Breakers:

1. Standard: ASSE 1011.
2. Body: Bronze, nonremovable, with manual drain.
3. Outlet Connection: Garden-hose threaded complying with ASME B1.20.7.
4. Finish: Rough bronze.

2.4 TEMPERATURE-ACTUATED, WATER MIXING VALVES

A. Water-Temperature Limiting Devices:

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

   a. Leonard Valve Company.
   b. POWERS; A WATTS Brand.
   c. Symmons Industries, Inc.
   d. WATTS.

2. Standard: ASSE 1017.
3. Pressure Rating: 125 psig.
4. Type: Thermostatically controlled, water mixing valve.
5. Material: Bronze body with corrosion-resistant interior components.
6. Connections: Threaded or compression inlets and outlet.
7. Accessories: Check stops on hot- and cold-water supplies, and adjustable, temperature-control handle.
8. Tempered-Water Setting: 105 deg F.
9. Tempered-Water Design Flow Rate: 0.25 gpm minimum to 4 gpm.
10. Valve Finish: Rough bronze.

2.5 WALL HYDRANTS

A. Non-freeze Wall Hydrants:

1. Standard: ASME A112.21.3M for concealed-outlet, self-draining wall hydrants.
2. Pressure Rating: 125 psig.
3. Operation: Loose key.
4. Casing and Operating Rod: Of length required to match wall thickness. Include wall clamp.
5. Inlet: NPS 3/4 or NPS 1.
6. Outlet: Concealed, with integral vacuum breaker and garden-hose thread complying with ASME B1.20.7.
7. Box: Deep, flush mounted with cover.
8. Box and Cover Finish: Polished nickel bronze.
9. Outlet: Exposed, with integral vacuum breaker and garden-hose thread complying with ASME B1.20.7.
10. Operating Key(s): One with each wall hydrant.

2.6 DRAIN VALVES

A. Ball-Valve-Type, Hose-End Drain Valves:

1. Standard: MSS SP-110 for standard-port, two-piece ball valves.
2. Pressure Rating: 400-psig minimum CWP.
3. Size: NPS 3/4.
4. Body: Copper alloy.

5. Ball: Chrome-plated brass.
6. Seats and Seals: Replaceable.
7. Handle: Vinyl-covered steel.
8. Inlet: Threaded or solder joint.
9. Outlet: Threaded, short nipple with garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

2.7 WATER-HAMMER ARRESTERS

A. Water-Hammer Arresters:

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

   a. AMTROL, Inc.
   b. Jay R. Smith Mfg. Co.
   c. Josam Company.
   d. MIFAB, Inc.
   e. Precision Plumbing Products.
   f. Sioux Chief Manufacturing Company, Inc.
   g. Tyler Pipe; a subsidiary of McWane Inc.
   h. WATTS.
   i. Zurn Industries, LLC.

2. Standard: ASSE 1010 or PDI-WH 201.
3. Type: Copper tube with piston.
4. Size: ASSE 1010, Sizes AA and A through F, or PDI-WH 201, Sizes A through F.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install backflow preventers in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.

1. Locate backflow preventers in same room as connected equipment or system.
2. Install drain for backflow preventers with atmospheric-vent drain connection with air-gap fitting, fixed air-gap fitting, or equivalent positive pipe separation of at least two pipe diameters in drain piping and pipe-to-floor drain. Locate air-gap device attached to or under backflow preventer. Simple air breaks are unacceptable for this application.
3. Do not install bypass piping around backflow preventers.

B. Install balancing valves in locations where they can easily be adjusted.

C. Install temperature-actuated, water mixing valves with check stops on inlets.

1. Install units recessed surface mounted on wall as specified.

D. Install water-hammer arresters in water piping according to PDI-WH 201.

3.2 CONNECTIONS

A. Comply with requirements for ground equipment in Section 260526 "Grounding and Bonding for Electrical Systems."

3.3 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Test each device according to authorities having jurisdiction and the device's reference standard.

B. Domestic water piping specialties will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports.

3.4 ADJUSTING

A. Set field-adjustable temperature set points of temperature-actuated, water mixing valves.

END OF SECTION

SECTION 22 13 16 – SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Plumbing Contractor Provide. Base Bid and Alternate Bid.

1. PVC pipe and fittings.
2. Specialty pipe fittings.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:

1. Soil, Waste, and Vent Piping: 10-foot head of water.

2.2 PIPING MATERIALS

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.3 PVC PIPE AND FITTINGS

A. Comply with NSF 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping and "NSF-sewer" for plastic sewer piping.

B. Solid-Wall PVC Pipe: ASTM D 2665, drain, waste, and vent.

C. PVC Socket Fittings: ASTM D 2665, made to ASTM D 3311, drain, waste, and vent patterns and to fit Schedule 40 pipe.

D. Adhesive Primer: ASTM F 656.

E. Solvent Cement: ASTM D 2564.

2.4 SPECIALTY PIPE FITTINGS

A. Transition Couplings:

1. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
2. Unshielded, Non-pressure Transition Couplings:

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

1) Dallas Specialty & Mfg. Co.
2) Fernco Inc.
3) Froet Industries LLC.
4) Mission Rubber Company, LLC; a division of MCP Industries.
5) Plastic Oddities.

b. Standard: ASTM C 1173.
c. Description: Elastomeric, sleeve-type, reducing or transition pattern. Include shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.
d. End Connections: Same size as and compatible with pipes to be joined.
e. Sleeve Materials:

1) For Cast-Iron Soil Pipes: ASTM C 564, rubber.
2) For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
3) For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

PART 3 - EXECUTION

3.1 EARTH MOVING

A. Comply with requirements for excavating, trenching, and backfilling specified in Section 312000 "Earth Moving."

3.2 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems.

1. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations.
2. Install piping as indicated unless deviations to layout are approved on coordination drawings.

B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping to permit valve servicing.

F. Install piping at indicated slopes.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Install piping to allow application of insulation.

J. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends.

1. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical.
2. Use long-turn, double Y-branch and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe.

    a. Straight tees, elbows, and crosses may be used on vent lines.

3. Do not change direction of flow more than 90 degrees.
4. Use proper size of standard increasers and reducers if pipes of different sizes are connected.

    a. Reducing size of waste piping in direction of flow is prohibited.

K. Lay buried building waste piping beginning at low point of each system.

1. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream.
2. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
3. Maintain swab in piping and pull past each joint as completed.

L. Install soil and waste and vent piping at the following minimum slopes unless otherwise indicated:

1. Building Sanitary Waste: 2 percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.
2. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.

M. Install aboveground PVC piping according to ASTM D 2665.

N. Install underground PVC piping according to ASTM D 2321.

O. Plumbing Specialties:

1. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers in sanitary waste gravity-flow piping.

a. Comply with requirements for cleanouts specified in Section 221319 "Sanitary Waste Piping Specialties."

2. Install drains in sanitary waste gravity-flow piping.

a. Comply with requirements for drains specified in Section 221319 "Sanitary Waste Piping Specialties."

P. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

Q. Install sleeves for piping penetrations of walls, ceilings, and floors.

1. Comply with requirements for sleeves specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

R. Install sleeve seals for piping penetrations of concrete walls and slabs.

1. Comply with requirements for sleeve seals specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

S. Install escutcheons for piping penetrations of walls, ceilings, and floors.

1. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."

3.3 JOINT CONSTRUCTION

A. Plastic, Non-pressure-Piping, Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
2. PVC Piping: Join according to ASTM D 2855 and ASTM D 2665 appendixes.

3.4 SPECIALTY PIPE FITTING INSTALLATION

A. Transition Couplings:

1. Install transition couplings at joints of piping with small differences in ODs.
2. In Waste Drainage Piping: Unshielded, non-pressure transition couplings.

3.5 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements for seismic-restraint devices.

B. Comply with requirements for pipe hanger and support devices and installation specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

1. Install carbon-steel pipe hangers for horizontal piping in noncorrosive environments.
2. Install carbon-steel pipe support clamps for vertical piping in noncorrosive environments.
3. Install stainless-steel pipe support clamps for vertical piping in corrosive environments.
4. Vertical Piping: MSS Type 8 or Type 42, clamps.
5. Install individual, straight, horizontal piping runs:

    a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.

C. Support horizontal piping and tubing within 12 inches of each fitting and coupling.

D. Support vertical piping and tubing at base and at each floor.

E. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.

F. Install hangers for PVC piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/2 and NPS 2: 48 inches with 3/8-inch rod.
2. NPS 3: 48 inches with 1/2-inch rod.
3. NPS 4 and NPS 5: 48 inches with 5/8-inch rod.
4. NPS 6 and NPS 8: 48 inches with 3/4-inch rod.

G. Install supports for vertical PVC piping every 48 inches.

H. Support piping and tubing not listed above according to MSS SP-58 and manufacturer's written instructions.

3.6 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.

C. Connect waste and vent piping to the following:

1. Plumbing Fixtures: Connect waste piping in sizes indicated, but not smaller than required by plumbing code.
2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
3. Plumbing Specialties: Connect waste and vent piping in sizes indicated, but not smaller than required by plumbing code.
4. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.
5. Comply with requirements for cleanouts and drains specified in Section 221319 "Sanitary Waste Piping Specialties."

D. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.

3.7 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 3 dayss before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Re-inspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for re-inspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test sanitary waste and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired.

    a. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.

2. Leave uncovered and unconcealed new, altered, extended, or replaced waste and vent piping until it has been tested and approved.

    a. Expose work that was covered or concealed before it was tested.

3. Roughing-in Plumbing Test Procedure: Test waste and vent piping except outside leaders on completion of roughing-in.

    a. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water.
    b. From 15 minutes before inspection starts to completion of inspection, water level must not drop.
    c. Inspect joints for leaks.

4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight.

    a. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch WG.
    b. Use U-tube or manometer inserted in trap of water closet to measure this pressure.
    c. Air pressure must remain constant without introducing additional air throughout period of inspection.
    d. Inspect plumbing fixture connections for gas and water leaks.

5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
6. Prepare reports for tests and required corrective action.

3.8 CLEANING AND PROTECTION

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect sanitary waste and vent piping during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

D. Exposed PVC Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.

E. Repair damage to adjacent materials caused by waste and vent piping installation.

3.9 PIPING SCHEDULE

A. Flanges and unions may be used on aboveground pressure piping unless otherwise indicated.

B. Aboveground, vent, soil and waste piping NPS 6 and smaller shall be the following:

1. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
2. Dissimilar Pipe-Material Couplings: Unshielded, non-pressure transition couplings.

C. Underground, soil and waste piping NPS 6 and larger shall be the following:

1. Solid-wall PVC pipe; PVC socket fittings; and solvent-cemented joints.
2. Dissimilar Pipe-Material Couplings: Unshielded, non-pressure transition couplings.

END OF SECTION

SECTION 22 13 19 – SANITARY WASTE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Plumbing Contractor Provide. Base Bid and Alternate Bid.

1. Cleanouts.
2. Floor Sinks.
3. Miscellaneous sanitary drainage piping specialties.

1.2 DEFINITIONS

A. PVC: Polyvinyl chloride.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTIONS

A. Sanitary waste piping specialties shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF 14 for plastic sanitary waste piping specialty components.

2.2 CLEANOUTS

A. Cast-Iron Exposed Floor Cleanouts:

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

    a. Jay R. Smith Mfg. Co.
    b. Josam Company.
    c. Tyler Pipe; a subsidiary of McWane Inc.
    d. Zurn Industries, LLC.

2. Standard: ASME A112.36.2M for adjustable housing cast-iron soil pipe with cast-iron ferrule cleanout.
3. Size: Same as connected branch.
4. Type: Adjustable housing.
5. Body or Ferrule: Cast iron.
6. Closure: Plastic plug.
7. Adjustable Housing Material: Cast iron with threads.
8. Frame and Cover Material and Finish: Nickel-bronze, copper alloy.
9. Frame and Cover Shape: Round.
10. Top Loading Classification: Heavy Duty.

B. Wall Cleanouts:

1. Wall Access: Square, stainless-steel wall-installation frame and cover.

2.3 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES

A. Floor Sinks:

1. See PLUMBING FIXTURE SCHEDULE on plans.
2. Size: Same as connected waste piping.

B. Deep-Seal Traps:

1. Description: Schedule 40 PVC.
2. Size: Same as connected waste piping.

a. Water seal depth equal to specified depth in Illinois State Plumbing Code.
b. NPS 2: 4-inch-minimum water seal.
c. NPS 2-1/2 and Larger: 5-inch-minimum water seal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:

1. Size same as drainage piping.
2. Locate at each change in direction of piping greater than 90 degrees or as specified in the Illinois State Plumbing Code.
3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
4. Locate at base of each vertical soil and waste stack.

B. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.

C. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.

D. Install wood-blocking reinforcement for wall-mounting-type specialties.

E. Install floor sinks at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.

1. Position floor drains for easy access and maintenance.
2. Set floor drains grate flush with finished floor at low point in floor to allow floor drainage.

3. Set with grates depressed according to the following drainage area radii:

    a. Radius, 30 Inches or Less: Equivalent to 1 percent slope, but not less than 1/4-inch total depression.
    b. Radius, 30 to 60 Inches: Equivalent to 1 percent slope.
    c. Radius, 60 Inches or Larger: Equivalent to 1 percent slope, but not greater than 1-inch total depression.

4. Install floor sink flashing collar or flange, so no leakage occurs between drain and adjoining flooring.
5. Install individual traps for floor sinks connected to sanitary building drain, unless otherwise indicated.

3.2 CONNECTIONS

A. Comply with requirements in Section 221316 "Sanitary Waste and Vent Piping" for piping installation requirements. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment to allow service and maintenance.

C. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

D. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.3 PROTECTION

A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.

B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION

SECTION 22 13 19.13 – SANITARY DRAINS

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Plumbing Contractor Provide. Base Bid and Alternate Bid.

1. Floor drains.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 DRAIN ASSEMBLIES

A. Sanitary drains shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF 14 for plastic sanitary piping specialty components.

2.2 FLOOR DRAINS

A. Cast-Iron Floor Drains:

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

a. Jay R. Smith Mfg. Co.
b. Josam Company.
c. MIFAB, Inc.
d. Zurn Industries, LLC.

2. Standard: ASME A112.6.3.
3. Pattern: Floor drain.
4. Body Material: Gray iron.
5. Seepage Flange: Not required.
6. Anchor Flange: Not required.
7. Clamping Device: Not required.
8. Outlet: Bottom.
9. Sediment Bucket: Not required.
10. Top or Strainer Material: Polished Nickel bronze.
11. Top Shape: Round.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.

1. Position floor drains for easy access and maintenance.
2. Set floor drains below elevation of surrounding finished floor to allow floor drainage.
3. Install floor-drain flashing collar or flange, so no leakage occurs between drain and adjoining flooring.

a. Maintain integrity of waterproof membranes where penetrated.

4. Install individual traps for floor drains connected to sanitary building drain.

3.2 CONNECTIONS

A. Comply with requirements in Section 221316 "Sanitary Waste and Vent Piping" for piping installation requirements. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Comply with requirements in Section 221319 "Sanitary Waste Piping Specialties" for backwater valves, air admittance devices and miscellaneous sanitary drainage piping specialties.

C. Install piping adjacent to equipment to allow service and maintenance.

D. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

3.3 PROTECTION

A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.

B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION

SECTION 22 33 00 – ELECTRIC, DOMESTIC-WATER HEATERS

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Plumbing Contractor Provide. Base Bid and Alternate Bid.

1. Commercial, light-duty, storage, electric, domestic-water heaters.
2. Domestic-water heater accessories.

1.2 ACTION SUBMITTALS

A. Product Data: For each type and size of domestic-water heater indicated.

1.3 INFORMATIONAL SUBMITTALS

A. Domestic-Water Heater Labeling: Certified and labeled by testing agency acceptable to authorities having jurisdiction.

B. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1.

C. NSF Compliance: Fabricate and label equipment components that will be in contact with potable water to comply with NSF 61 Annex G, "Drinking Water System Components - Health Effects."

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of electric, domestic-water heaters that fail in materials or workmanship within specified warranty period.

PART 2 - PRODUCTS

2.1 COMMERCIAL, ELECTRIC, DOMESTIC-WATER HEATERS

A. Commercial, Light-Duty, Storage, Electric, Domestic-Water Heaters:

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

    a. Bradford White Corporation.
    b. Rheem Manufacturing Company.
    c. Smith, A. O. Corporation.
    d. State Industries.

2. Standard: UL 174.
3. Storage-Tank Construction: Steel, vertical arrangement.

    a. Tappings: ASME B1.20.1 pipe thread.
    b. Pressure Rating: 150 psig.
    c. Interior Finish: Comply with NSF 61 Annex G barrier materials for potable-water tank linings, including extending lining material into tappings.

4. Factory-Installed Storage-Tank Appurtenances:

    a. Anode Rod: Replaceable magnesium.
    b. Dip Tube: Required unless cold-water inlet is near bottom of tank.
    c. Drain Valve: ASSE 1005.
    d. Insulation: Comply with ASHRAE/IESNA 90.1.
    e. Jacket: Steel with enameled finish.
    f. Heat-Trap Fittings: Inlet type in cold-water inlet and outlet type in hot-water outlet.
    g. Heating Elements: Two; electric, screw-in immersion type; wired for simultaneous operation unless otherwise indicated. Limited to 12 kW total.
    h. Temperature Control: Adjustable thermostat.
    i. Safety Control: High-temperature-limit cutoff device or system.
    j. Relief Valve: ASME rated and stamped for combination temperature-and-pressure relief valves. Include relieving capacity at least as great as heat input, and include pressure setting less than domestic-water heater working-pressure rating. Select relief valve with sensing element that extends into storage tank.

5. Special Requirements: NSF 5 construction with legs for off-floor installation.

2.2 DOMESTIC-WATER HEATER ACCESSORIES

A. Domestic-Water Compression Tanks:

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

    a. AMTROL, Inc.
    b. Smith, A. O. Corporation.
    c. State Industries.
    d. TACO Comfort Solutions, Inc.

2. Description: Steel pressure-rated tank constructed with welded joints and factory-installed butyl-rubber diaphragm. Include air precharge to minimum system-operating pressure at tank.
3. Construction:

    a. Tappings: Factory-fabricated steel, welded to tank before testing and labeling. Include ASME B1.20.1 pipe thread.
    b. Interior Finish: Comply with NSF 61 Annex G barrier materials for potable-water tank linings, including extending finish into and through tank fittings and outlets.
    c. Air-Charging Valve: Factory installed.

4. Capacity and Characteristics:

    a. Working-Pressure Rating: 100 psig.
    b. Air Precharge Pressure: 50 psig.
    c. Size per manufacturer recommendations.

B. Drain Pans: Corrosion-resistant metal with raised edge. Comply with ANSI/CSA LC 3. Include dimensions not less than base of domestic-water heater, and include drain outlet not less than NPS 3/4 with ASME B1.20.1 pipe threads or with ASME B1.20.7 garden-hose threads.

C. Heat-Trap Fittings: ASHRAE 90.2.

D. Combination Temperature-and-Pressure Relief Valves: ASME rated and stamped. Include relieving capacity at least as great as heat input, and include pressure setting less than domestic-water heater working-pressure rating. Select relief valves with sensing element that extends into storage tank.

E. Vacuum Relief Valves: ANSI Z21.22/CSA 4.4.

F. Shock Absorbers: ASSE 1010 or PDI-WH 201, Size A water hammer arrester.

2.3 SOURCE QUALITY CONTROL

A. Factory Tests: Test and inspect domestic-water heaters specified to be ASME-code construction, according to ASME Boiler and Pressure Vessel Code.

PART 3 - EXECUTION

3.1 DOMESTIC-WATER HEATER INSTALLATION

A. Commercial, Electric, Domestic-Water Heater Mounting: Install commercial, electric, domestic-water heaters on shelf.

1. Install commercial, electric, domestic-water heaters on an suspended platform as indicated.
2. Maintain manufacturer's recommended clearances.
3. Arrange units so controls and devices that require servicing are accessible.
4. Install fasteners to secure shelf to wall or structure as required.
5. Install anchor bolts to elevations required for proper attachment to supported equipment.

B. Install electric, domestic-water heaters level and plumb, according to layout drawings, original design, and referenced standards. Maintain manufacturer's recommended clearances. Arrange units so controls and devices needing service are accessible.

1. Install shutoff valves on domestic-water-supply piping to domestic-water heaters and on domestic-hot-water outlet piping. Comply with requirements for shutoff valves specified in Section 220523.12 "Ball Valves for Plumbing Piping."

C. Install combination temperature-and-pressure relief valves in top portion of storage tanks. Use relief valves with sensing elements that extend into tanks. Extend water-heater relief-valve outlet, with drain piping same as domestic-water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.

D. Install piping-type heat traps on inlet and outlet piping of electric, domestic-water heater storage tanks without integral or fitting-type heat traps.

E. Fill electric, domestic-water heaters with water.

F. Charge domestic-water compression tanks with air.

3.2 CONNECTIONS

A. Comply with requirements for piping specified in Section 221116 "Domestic Water Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

B. Where installing piping adjacent to electric, domestic-water heaters, allow space for service and maintenance of water heaters. Arrange piping for easy removal of domestic-water heaters.

3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Electric, domestic-water heaters will be considered defective if they do not pass tests and inspections. Comply with requirements in Section 014000 "Quality Requirements" for retesting and reinspecting requirements and Section 017300 "Execution" for requirements for correcting the Work.

C. Prepare test and inspection reports.

END OF SECTION

SECTION 22 42 13.13 – COMMERCIAL WATER CLOSETS

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Plumbing Contractor Provide. Base Bid and Alternate Bid.

1. Water closets.
2. Flushometer valves.
3. Toilet seats.
4. Supports.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include diagrams for power, signal, and control wiring.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For flushometer valves to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 FLOOR-MOUNTED, BOTTOM-OUTLET WATER CLOSETS

A. Water Closets: Floor mounted, bottom outlet, top spud.

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

a. American Standard America.
b. Kohler Co.
c. TOTO USA, INC.
d. Zurn Industries, LLC.

2. Bowl:

a. Standards: ASME A112.19.2/CSA B45.1 and ASME A112.19.5.
b. Material: Vitreous china.
c. Type: Siphon jet.
d. Style: Flushometer valve.
e. Height: Standard and Handicapped/elderly, complying with ICC/ANSI A117.1.
f. Rim Contour: Elongated.
g. Water Consumption: 1.6 gal. per flush.
h. Spud Size and Location: NPS 1-1/2; top.
i. Color: White.

3. Bowl-to-Drain Connecting Fitting: ASTM A 1045 or ASME A112.4.3.

2.2 FLUSHOMETER VALVES

A. Lever-Handle, Diaphragm Flushometer Valves:

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

   a. Delany Products.
   b. Sloan Valve Company.
   c. Zurn Industries, LLC.

2. Standard: ASSE 1037.
3. Minimum Pressure Rating: 125 psig.
4. Features: Include integral check stop and backflow-prevention device.
5. Material: Brass body with corrosion-resistant components.
6. Valve Finish: Chrome plated.
7. Style: Exposed.
8. Consumption: 1.6 gal. per flush.
9. Minimum Inlet: NPS 1.
10. Minimum Outlet: NPS 1-1/4.
11. Provide with stop cap.

2.3 TOILET SEATS

A. Toilet Seats:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Bemis Manufacturing Company.
   b. Church Seats; Bemis Manufacturing Company.
   c. Olsonite Seat Co.

2. Standard: IAPMO/ANSI Z124.5.
3. Material: Plastic.
4. Type: Commercial (Heavy duty).
5. Shape: Elongated rim, open front.
6. Hinge: Self-sustaining, check.
7. Hinge Material: Non-corroding metal.
8. Seat Cover: Not required.
9. Color: White.

2.4 SUPPORTS

A. Flush Valve:

1. Provide supports for flush valve components.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Water-Closet Installation:

1. Install level and plumb according to roughing-in drawings.
2. Install floor-mounted water closets on bowl-to-drain connecting fitting attachments to piping or building substrate.

B. Support Installation:

1. Provide supports for flush valve components.

C. Flushometer-Valve Installation:

1. Install flushometer-valve, water-supply fitting on each supply to each water closet.
2. Attach supply piping to supports or substrate within pipe spaces behind fixtures.
3. Install lever-handle flushometer valves for accessible water closets with handle mounted on open side of water closet.
4. Install actuators in locations that are easy for people with disabilities to reach.

D. Install toilet seats on water closets.

E. Wall Flange and Escutcheon Installation:

1. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations and within cabinets and millwork.
2. Install deep-pattern escutcheons if required to conceal protruding fittings.
3. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."

F. Joint Sealing:

1. Seal joints between water closets and walls and floors using sanitary-type, one-part, mildew-resistant silicone sealant.
2. Match sealant color to water-closet color.
3. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

3.2 CONNECTIONS

A. Connect water closets with water supplies and soil, waste, and vent piping. Use size fittings required to match water closets.

B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."

C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

D. Where installing piping adjacent to water closets, allow space for service and maintenance.

3.3 ADJUSTING

A. Operate and adjust water closets and controls. Replace damaged and malfunctioning water closets, fittings, and controls.

B. Adjust water pressure at flushometer valves to produce proper flow.

3.4 CLEANING AND PROTECTION

A. Clean water closets and fittings with manufacturers' recommended cleaning methods and materials.

B. Install protective covering for installed water closets and fittings.

C. Do not allow use of water closets for temporary facilities unless approved in writing by Owner.

END OF SECTION

SECTION 22 42 13.16 – COMMERCIAL URINALS

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Plumbing Contractor Provide. Base Bid and Alternate Bid.

1. Urinals.
2. Flushometer valves.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include diagrams for power, signal, and control wiring.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For flushometer valves to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 WALL-HUNG URINALS

A. Urinals: Wall hung, back outlet, washout, accessible.

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

a. American Standard America.
b. Kohler Co.
c. TOTO USA, INC.
d. Zurn Industries, LLC.

2. Fixture:

a. Standards: ASME A112.19.2/CSA B45.1 and ASME A112.19.5.
b. Material: Vitreous china.
c. Type: Washout with extended shields.
d. Strainer or Trapway: Manufacturer's standard strainer with integral trap.
e. Water Consumption: Low.
f. Spud Size and Location: NPS 3/4, top.
g. Outlet Size and Location: NPS 2, back.
h. Color: White.

3. Waste Fitting:

    a. Standard: ASME A112.18.2/CSA B125.2 for coupling.
    b. Size: NPS 2.

4. Support: Type I Urinal Carrier with fixture support plates and coupling with seal and fixture bolts and hardware matching fixture. Include steel uprights.
5. Urinal Mounting Height: Standard and Handicapped/elderly according to ICC A117.1.

2.2 URINAL FLUSHOMETER VALVES

A. Lever-Handle, Diaphragm Flushometer Valves:

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

    a. Delany Products.
    b. Sloan Valve Company.
    c. Zurn Industries, LLC.

2. Standard: ASSE 1037.
3. Minimum Pressure Rating: 125 psig.
4. Features: Include integral check stop and backflow-prevention device.
5. Material: Brass body with corrosion-resistant components.
6. Valve Finish: Chrome plated.
7. Style: Exposed.
8. Consumption: 0.5 gal. per flush.
9. Minimum Inlet: NPS 3/4.
10. Minimum Outlet: NPS 3/4.
11. Provide with stop cap.

2.3 SUPPORTS

A. Urinal Carrier:

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

    a. Jay R. Smith Mfg. Co.
    b. Josam Company.
    c. Wade Drains.
    d. Zurn Industries, LLC.

B. Flush Valves:

1. Provide supports for flush valve system components.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before urinal installation.

B. Examine walls and floors for suitable conditions where urinals will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Urinal Installation:

1. Install urinals level and plumb according to roughing-in drawings.
2. Install wall-hung, back-outlet urinals onto waste fitting seals and attached to supports.
3. Install accessible, wall-mounted urinals at mounting height for the handicapped/elderly, according to ICC/ANSI A117.1.

B. Support Installation:

1. Install supports, affixed to building substrate, for wall-hung urinals.
2. Use off-floor carriers with waste fitting and seal for back-outlet urinals.

C. Flushometer-Valve Installation:

1. Install flushometer-valve water-supply fitting on each supply to each urinal.
2. Attach supply piping to supports or substrate within pipe spaces behind fixtures.

D. Wall Flange and Escutcheon Installation:

1. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations.
2. Install deep-pattern escutcheons if required to conceal protruding fittings.
3. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."

E. Joint Sealing:

1. Seal joints between urinals and walls and floors using sanitary-type, one-part, mildew-resistant silicone sealant.
2. Match sealant color to urinal color.
3. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

3.3 CONNECTIONS

A. Connect urinals with water supplies and soil, waste, and vent piping. Use size fittings required to match urinals.

B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."

C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

D. Where installing piping adjacent to urinals, allow space for service and maintenance.

3.4 ADJUSTING

A. Operate and adjust urinals and controls. Replace damaged and malfunctioning urinals, fittings, and controls.

B. Adjust water pressure at flushometer valves to produce proper flow.

3.5 CLEANING AND PROTECTION

A. Clean urinals and fittings with manufacturers' recommended cleaning methods and materials.

B. Install protective covering for installed urinals and fittings.

C. Do not allow use of urinals for temporary facilities unless approved in writing by Owner.

END OF SECTION

SECTION 22 42 16.13 – COMMERCIAL LAVATORIES

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Plumbing Contractor Provide. Base Bid and Alternate Bid.

1. Lavatories.
2. Faucets.
3. Supports.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include diagrams for power, signal, and control wiring of automatic faucets.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Counter cutout templates for mounting of counter-mounted lavatories.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For lavatories and faucets to include in operation and maintenance manuals.

1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

a. Servicing and adjustments of automatic faucets.

PART 2 - PRODUCTS

2.1 VITREOUS-CHINA, WALL-MOUNTED LAVATORIES

A. Lavatory: Vitreous china, wall mounted, with back.

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

a. American Standard America.
b. Kohler Co.
c. Zurn Industries, LLC.
d. Toto.

2. Fixture:

    a. Standard: ASME A112.19.2/CSA B45.1.
    b. Type: For wall hanging.
    c. Nominal Size: 20 by 18 inches.
    d. Faucet-Hole Punching: Match with faucet.
    e. Faucet-Hole Location: Top.
    f. Color: White.
    g. Mounting Material: Chair carrier.

3. Faucet: Manual, metering operated.
4. Support: Floor-mounted, Include steel uprights.
5. Lavatory Mounting Height: Standard and Handicapped/elderly according to ICC A117.1.

2.2 METERING OPERATED FAUCETS

A. NSF Standard: Comply with NSF/ANSI 61 Annex G, "Drinking Water System Components - Health Effects," for faucet materials that will be in contact with potable water.

B. Lavatory Faucets: Manual-type, two-handle mixing, commercial, solid-brass valve.

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

    a. Delta Faucet Company, Commercial.
    b. American Standard.
    c. Chicago Faucets; Gerberit Company.
    d. Kohler Co.

2. Standard: ASME A112.18.1/CSA B125.1.
3. General: Compression manual operated, with trim plate, deck mounted, grid strainer and tail piece.
4. Body Type: 4” Center-set hole.
5. Body Material: Commercial.
6. Finish: Polished chrome plate.
7. Maximum Flow Rate: 0.5 gpm.

2.3 SUPPORTS

A. Wall-mounted Lavatory Carrier:

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

    a. Jay R. Smith Mfg. Co.
    b. Josam Company.
    c. Wade Drains.
    d. Zurn Industries, LLC.

2. Standard: ASME A112.6.1M.
3. Floor-mounted foot supported; steel uprights; universal bearing plate.

2.4 SUPPLY FITTINGS

A. NSF Standard: Comply with NSF/ANSI 61 Annex G, "Drinking Water System Components - Health Effects," for supply-fitting materials that will be in contact with potable water.

B. Standard: ASME A112.18.1/CSA B125.1.

C. Supply Piping: Chrome-plated-brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated-brass or stainless-steel wall flange.

D. Supply Stops: Ball Valve specified in Section 220523 “Ball Valves for Plumbing Piping”.

E. Operation: Lever handle.

F. Risers:

1. NPS 3/8.
2. Chrome-plated, soft-copper flexible tube riser through wall to fixture.

2.5 WASTE FITTINGS

A. Standard: ASME A112.18.2/CSA B125.2.

B. Drain: Grid type with NPS 1-1/4 offset and straight tailpiece.

C. Trap:

1. Size: NPS 1-1/2 by NPS 1-1/4.
2. Material: Chrome-plated, two-piece, cast-brass trap and swivel elbow with 0.032-inch-thick brass tube to wall; and chrome-plated, brass or steel wall flange.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before lavatory installation.

B. Examine walls for suitable conditions where lavatories will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install lavatories level and plumb according to roughing-in drawings.

B. Install supports, affixed to building substrate, for wall-mounted lavatories.

C. Install accessible wall-mounted lavatories at handicapped/elderly mounting height for people with disabilities or the elderly, according to ICC/ANSI A117.1.

D. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."

E. Seal joints between lavatories and counters and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

F. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible lavatories. Comply with requirements in Section 220719 "Plumbing Piping Insulation."

3.3 CONNECTIONS

A. Connect fixtures with water supplies, thermostatic mixing valves, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."

C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

3.4 ADJUSTING

A. Operate and adjust lavatories and controls. Replace damaged and malfunctioning lavatories, fittings, and controls.

B. Adjust water pressure at faucets to produce proper flow.

C. Adjust electronic-sensor mechanisms.

3.5 CLEANING AND PROTECTION

A. After completing installation of lavatories, inspect and repair damaged finishes.

B. Clean lavatories, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.

C. Provide protective covering for installed lavatories and fittings.

D. Do not allow use of lavatories for temporary facilities unless approved in writing by Owner.

END OF SECTION

SECTION 22 21 16.16 – COMMERCIAL SINKS

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Plumbing Contractor Provide. Base Bid and Alternate Bid.

1. Mop basins.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance data.

PART 2 - PRODUCTS

2.1 MOP BASINS

A. Mop Basins: Plastic, floor mounted.

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

a. Fiat.
b. Mustee
c. Stern-Williams.

2. Fixture:

a. Standard: IAPMO/ANSI Z124.6.
b. Material: Cast polymer.
c. Nominal Size: 24 by 24 by 10 inches.
d. Tiling Flange: Not required.
e. Drain: Grid with NPS 2 outlet.

3. Mounting: On floor and flush to wall.
4. Faucet: As scheduled on the plans.
5. Splash Guards: As scheduled on the plans.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before sink installation.

B. Examine walls, and floors for suitable conditions where sinks will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install sinks level and plumb according to roughing-in drawings.

B. Install supports, affixed to building substrate, for wall-hung sinks.

C. Install water-supply piping with stop on each supply to each sink faucet.

D. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."

E. Seal joints between sinks and floors, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

F. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible sinks. Comply with requirements in Section 220719 "Plumbing Piping Insulation."

3.3 CONNECTIONS

A. Connect sinks with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."

C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

3.4 ADJUSTING

A. Operate and adjust sinks and controls. Replace damaged and malfunctioning sinks, fittings, and controls.

B. Adjust water pressure at faucets to produce proper flow.

3.5 CLEANING AND PROTECTION

A. After completing installation of sinks, inspect and repair damaged finishes.

B. Clean sinks, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.

C. Provide protective covering for installed sinks and fittings.

D. Do not allow use of sinks for temporary facilities unless approved in writing by Owner.

END OF SECTION

SECTION 22 47 16 – PRESSURE WATER COOLERS

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Plumbing Contractor Provide. Base Bid and Alternate Bid.

1. Pressure water coolers.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of pressure water cooler.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For pressure water coolers to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 PRESSURE WATER COOLERS

A. Pressure Water Coolers: Wall mounted, dual-level, wheelchair accessible.

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

a. Elkay Manufacturing Co.
b. Halsey Taylor.
c. Haws Corporation.

2. Standards:

a. Comply with NSF 61 Annex G.
b. Comply with ASHRAE 34, "Designation and Safety Classification of Refrigerants," for water coolers. Provide HFC 134a (tetrafluoroethane) refrigerant unless otherwise indicated.

3. Cabinet: Bi-level with two attached cabinets, all stainless steel.
4. Bubbler: One, with adjustable stream regulator, located on each cabinet deck.
5. Control: Push bar for each level.
6. Drains: Grid with NPS 1-1/4 tailpiece.
7. Supplies: NPS 3/8 with shutoff valve.
8. Waste Fitting: ASME A112.18.2/CSA B125.2, NPS 1-1/4 brass P-trap.

a. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

9. Capacities and Characteristics:

    a. Cooled Water: 8 gph.
    b. Ambient-Air Temperature: 90 deg F.
    c. Inlet-Water Temperature: 80 deg F.

10. Water Cooler Mounting Height: Standard and Handicapped/elderly according to ICC A117.1. Verify mounting height with exterior surfaces as required to meet standards for final locations.

2.2 SUPPORTS

A. Water Cooler Carrier:

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

    a. Jay R. Smith Mfg. Co.
    b. Josam Company.
    c. Wade Drains.
    d. Zurn Industries, LLC.

2. Standard: ASME A112.6.1M.
3. Dual-level, floor-mounted with steel uprights, two wall plates and two lower bearing plates.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for water-supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before fixture installation.

B. Examine walls and floors for suitable conditions where fixtures will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install fixtures level and plumb according to roughing-in drawings. For fixtures indicated for children, install at height required by authorities having jurisdiction.

B. Install off-the-floor carrier supports, affixed to building substrate, for wall-mounted fixtures.

C. Install water-supply piping with shutoff valve on supply to each fixture to be connected to domestic-water distribution piping. Use ball valve. Install valves in locations where they can be easily reached for operation. Valves are specified in Section 220523.12 "Ball Valves for Plumbing Piping."

D. Install trap and waste piping on drain outlet of each fixture to be connected to sanitary drainage system.

E. Seal joints between fixtures and walls using sanitary-type, one-part, mildew-resistant, silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

3.3 CONNECTIONS

A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."

C. Install ball shutoff valve on water supply to each fixture. Comply with valve requirements specified in Section 220523.12 "Ball Valves for Plumbing Piping."

D. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

3.4 ADJUSTING

A. Adjust fixture flow regulators for proper flow and stream height.

3.5 CLEANING

A. After installing fixture, inspect unit. Remove paint splatters and other spots, dirt, and debris. Repair damaged finish to match original finish.

B. Clean fixtures, on completion of installation, according to manufacturer's written instructions.

C. Provide protective covering for installed fixtures.

D. Do not allow use of fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION

SECTION 23 05 00 – BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.1 WORK INCLUDES

A. The Conditions of the Contract and General Requirements of this Project Manual apply to the General Contractor, Subcontractor, material suppliers and all other persons furnishing labor and materials under this Section.

B. Base Bid:

1. Contractor Provide:

a. Work as outlined on drawings and specified herein.
b. Install and provide all low voltage cabling in conduit where required for HVAC systems.

C. Alternate Bid #1:

1. Contractor Provide:

a. Work associated with Storage 104 addition.

1.2 RELATED WORK

A. Specified Elsewhere:

1. Section 23 0513 – “Common Motor Requirements for HVAC Equipment.”
2. Section 23 3113 – “Metal Ducts.”
3. Section 23 3423 – “HVAC Power Ventilators.”
4. Section 23 82 39.19 – “Wall and Ceiling Unit Heaters.”

1.3 QUALITY ASSURANCE

A. All Mechanical work shall comply with the International Energy Conservation Code (IECC 2015).

B. All materials and equipment furnished shall be new and to the extent possible, standard products of the various manufacturers except where special construction or performance features are called for. Where more than one of any specific item is required, all shall be of the same type and manufacturer.

C. The product of specified acceptable manufacturers shall be acceptable only when that product complies with or is modified as necessary to comply with all specified and indicated requirements (listed herein or on the Drawings).

D. Materials and equipment not herein specified or indicated as to manufacturer but necessary for complete functioning systems, shall be provided from sources conforming to the quality levels and functional requirements for corresponding materials and equipment set forth herein.

1.4 INTENT

A. It is the intent of the Mechanical Division of these Specifications that all mechanical work specified herein be coordinated as required with the work of all other Divisions of the Specifications and the Drawings so that all installations shall operate as designed. All systems shall be completely assembled, tested, adjusted, and demonstrated to be ready for operation to the satisfaction of the Architect/Engineer before acceptance by the Owner. Minor details not usually shown or specified, but necessary for proper installation and operation, shall be included in the Work, the same as if herein specified or shown.

1.5 REGULATORY AGENCIES, CODES, AND STANDARDS

A. Governing state, local governmental laws, ordinances, referenced codes and standards constitute minimum requirements and strict compliance shall be part of the Contract Documents.

B. The Contractor shall include in the Work, without extra cost to the Owner, any labor, materials, services, apparatus, drawings, in order to comply with all applicable laws, ordinances, rules and regulations, whether or not shown on the drawings and/or specified.

C. Portions or all of certain recognized industry or association standards referred to herein as being a requirement of these Specifications shall be considered as binding as though reproduced in full herein. Unless otherwise stated the referenced standard shall be the standard which is current as of the date of issuance of these Specifications. Reference may be made to standards either by full name or for the sake of brevity by letter designation as follows:

1.	AABC	Associated Air Balance Council
2.	AGA	American Gas Association
3.	AMCA	Air Moving and Conditioning Association
4.	ANSI	American National Standards Institute
5.	ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc.
6.	IPC	Illinois Plumbing Code
7.	NEC	National Electric Code
8.	NEMA	National Electric Manufacturers Association
9.	NFPA	National Fire Protection Association
10.	OSHA	Occupational Safety and Health Administration
11.	SMACNA	Sheet Metal and Air Conditioning Contractors National Association, Inc.
12.	UL	Underwriters' Laboratories, Inc.
13.	IECC	International Energy Conservation Code

1.6 DRAWINGS

A. The layout shown on the Drawings is necessarily diagrammatic but shall be followed as closely as actual construction and as other work will permit. Changes from these Drawings required to make this Work conform to the building construction or other Work of other trades shall be made by the Contractor without additional cost to the Owner, but only with the prior approval of the Architect/Engineer. All major changes shall be shown on Shop Drawings and noted as such to be submitted before the changes are made.

1.7 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Materials and equipment shall not be delivered to the work site until their installation, according to the work schedule, is imminent. These materials and equipment shall be stored only in areas designated as Contractors storage areas.

B. Materials and equipment subject to deterioration shall be stored and protected accordingly.

C. Contractor shall be responsible for all damage to materials stored on site.

1.8 PROJECT CONDITIONS

A. When existing conditions prohibit the proper installation as shown on the Drawings or as specified herein, the Contractor shall notify the Architect/Engineer, in writing, requesting a solution.

B. Contractor is responsible for the verification of new and existing conditions on the site before that particular phase of installation begins.

C. Installation of systems specified shall be coordinated with all other work specified in the Contract Documents.

D. All expenses incurred by Architect/Engineer in troubleshooting systems and problems caused by inadequate workmanship or unauthorized or authorized deviations from the Contract Documents including materials or equipment substitutions on the part of a Contractor shall be borne by that Contractor.

1.9 WARRANTY & INSPECTIONS

A. The Contractor shall submit in writing a guarantee warranting all items of material, equipment and labor furnished to be free of defects for a minimum period of one (1) year from the date of final acceptance of the work by the Owner, and further agrees that if defects appear within stipulated guarantee period, same shall be replaced or made good without charge. See DIVISION 1 and other Sections in DIVISION 23 for additional requirements.

B. Where inspections of the work are required by State of Local authorities, obtain certificates of inspection of the work by such authorities, and these certificates (in triplicate) shall be submitted to the Architect/Engineer.

1.10 CUTTING & PATCHING

A. All cutting and patching of masonry, carpentry, steel, ironwork, concrete structural work, and finished surfaces belonging to the building shall be done in order that this work may be properly installed. All disturbed constructions or finishes shall be replaced or repaired to their original condition and under no condition shall structural work be cut except upon approval of the Architect/Engineer.

B. Cutting through ceilings, floors, walls and partitions shall be done in a careful manner and the openings filled around the pipes, conduits, and sleeves.

1.11 LOCATION OF EQUIPMENT

A. The approximate location of all equipment is shown on the Drawings.

B. The Architect/Engineer reserves the right to change the location of any equipment five (5) feet in any direction without these changes being made the subject of an extra charge provided such changes are made before final installation.

1.12 LINES AND LEVELS

A. Determine all grades, maintain necessary lines and levels throughout the progress of the work, and assume full responsibility for their correctness. Where levels are indicated on the Drawings, work shall be installed at those levels unless prior written approval to change is obtained from the Architect/Engineer.

1.13 GUARANTEE

A. In entering into a contract covering this work, the contractor accepts the specifications and guarantees that the work will be carried out in accordance with the requirements of this specification or such modifications as may be made under the contract documents.

B. Contractor further guarantees that the material will be of the best procurable and that none but experienced workman familiar with each particular class of work will be employed.

C. Contractor further guarantees, upon receipt of written notification from the Owner, to replace and make good at his own expense any defects, which may develop within the warranty period due to faulty workmanship or material, after final payment and acceptance by the Architect/Engineer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Each item of equipment furnished under these specifications is to be essentially the standard product of the manufacturer, however, component parts of equipment need not be products of one manufacturer.

B. All material and equipment shall be of the best quality normally used in good commercial practice, being products of reputable manufacturers. Each major component shall bear a nameplate stating name and address of the manufacturer and catalog number or designation. All materials shall be of the manufacturer's latest design standard, and bear Underwriter's Laboratories, Inc. label and the manufacturer's trademark.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Listed or Labeled Equipment

1. Listed or labeled equipment shall be installed in accordance with instructions included in the listing or labeling.
2. Every precaution has been taken to ensure Drawings and Specifications do comply with these instructions, if the Contractor feels some item or items may not comply with these instructions, notify the Architect/Engineer for a solution, prior to installation.

B. Anchors: All equipment shall be firmly attached to the structure using anchors, screws, hangers, etc. listed for the use intended.

3.2 MOVING OF MATERIAL

A. If necessary, the Contractor shall be responsible for moving temporarily located materials in order to complete final installation.

3.3 PROTECTION OF WORK

A. The Contractor shall protect his work from damage by keeping all equipment and materials protected.

END OF SECTION

SECTION 23 05 13 - COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general requirements for single-phase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on alternating-current power systems up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

1.2 COORDINATION

A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:

1. Motor controllers.
2. Torque, speed, and horsepower requirements of the load.
3. Ratings and characteristics of supply circuit and required control sequence.
4. Ambient and environmental conditions of installation location.

PART 2 - PRODUCTS

2.1 GENERAL MOTOR REQUIREMENTS

A. Comply with NEMA MG 1 unless otherwise indicated.

2.2 MOTOR CHARACTERISTICS

A. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 feet above sea level.

B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

2.3 SINGLE-PHASE MOTORS

A. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application:

1. Permanent-split capacitor.
2. Split phase.
3. Capacitor start, inductor run.
4. Capacitor start, capacitor run.

B. Multispeed Motors: Variable-torque, permanent-split-capacitor type.

C. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.

D. Motors 1/20 HP and Smaller: Shaded-pole type.

E. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 23 31 13 - METAL DUCTS

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. Single-wall rectangular ducts and fittings.
2. Sheet metal materials.
3. Sealants and gaskets.
4. Hangers and supports.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible" and with performance requirements and design criteria indicated in "Duct Schedule" Article.

B. Structural Performance: Duct hangers and supports shall withstand the effects of gravity loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards – Metal and Flexible".

C. Airstream Surfaces: Surfaces in contact with airstream shall comply with requirements in ASHRAE 62.1.

D. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 – "Systems and Equipment," and Section 7 – "Construction and System Startup."

E. ASHRAE/IES Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6.4.4 – "HVAC System Construction and Insulation."

F. Duct Dimensions: Unless otherwise indicated, all duct dimensions indicated on Drawings are inside clear dimensions and do not include insulation or duct wall thickness.

2.2 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.

1. Construct ducts of galvanized sheet steel unless otherwise indicated.

B. Transverse Joints: Fabricate joints in accordance with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards – Metal and Flexible."

1. For ducts with longest side less than 36 inches, select joint types in accordance with Figure 2-1.

C. Longitudinal Seams: Select seam types and fabricate in accordance with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards – Metal and Flexible."

D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate in accordance with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible," Ch. 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards – Metal and Flexible."

2.3 SHEET METAL MATERIALS

A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A653/A653M.

1. Galvanized Coating Designation: G60.

2.4 SEALANT AND GASKETS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested in accordance with UL 723; certified by an NRTL.

B. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.
10. Maximum Static-Pressure Class: 10-inch wg, positive or negative.

11. Service: Indoor or outdoor.
12. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

2.5 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Galvanized-steel rods and nuts.

B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."

D. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A603.

E. Steel Cable End Connections: Galvanized-steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

F. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

G. Trapeze and Riser Supports:

1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and coordination drawings.

B. Install ducts in accordance with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible" unless otherwise indicated.

C. Install ducts in maximum practical lengths with fewest possible joints.

D. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.

E. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

F. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

G. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.

H. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.

I. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.

J. Protect duct interiors from moisture, construction debris and dust, and other foreign materials both before and after installation. Comply with SMACNA's "IAQ Guidelines for Occupied Buildings Under Construction," Appendix G, "Duct Cleanliness for New Construction Guidelines."

K. Elbows: Use long-radius elbows wherever they fit.

1. Fabricate 90-degree rectangular mitered elbows to include turning vanes.

3.2 DUCT SEALING

A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article in accordance with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible."

B. Seal ducts at a minimum to the following seal classes in accordance with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible":

1. Comply with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible."
2. Exhaust Ducts: Seal Class B.

3.3 HANGER AND SUPPORT INSTALLATION

A. Comply with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible," Chapter 5, "Hangers and Supports."

B. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible," Table 5-1 and "Rectangular Duct Hangers Minimum Size" for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.

C. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.

D. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.4 DUCT SCHEDULE

A. Fabricate ducts with galvanized sheet steel except as otherwise indicated and as follows:

1. Fabricate all ducts to achieve SMACNA pressure class, seal class, and leakage class as indicated below.

B. Exhaust Ducts:

1. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:

a. Pressure Class: Negative 1-inch wg.
b. Minimum SMACNA Seal Class: A if negative pressure, and A if positive pressure.

C. Elbow Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible," Figure 4-2, "Rectangular Elbows."

a. Velocity 1000 fpm or Lower:

1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
2) Mitered Type RE 4 without vanes.

END OF SECTION

SECTION 23 34 23 – HVAC POWER VENTILATORS

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. Ceiling-mounted ventilators.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

PART 2 - PRODUCTS

2.1 CEILING-MOUNTED VENTILATORS

A. Housing: Steel, lined with acoustical insulation.

B. Fan Wheel: Centrifugal wheels directly mounted on motor shaft. Fan shrouds, motor, and fan wheel removable for service.

C. Back-draft damper: Integral.

D. Grille: Painted aluminum, louvered grille with flange on intake and thumbscrew or spring retainer attachment to fan housing.

E. Electrical Requirements: Junction box for electrical connection on housing and receptacle for motor plug-in.

F. Accessories:

1. Motion Sensor: Motion detector with adjustable shutoff timer. (EF-1 only)
2. Reverse-acting thermostat (adjustable).
3. Humidistat (adjustable).
4. Manufacturer's standard roof jack or wall cap, and transition fittings.

2.2 MOTORS

A. Comply with NEMA designation, temperature rating, service factor, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."

1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

2.3 SOURCE QUALITY CONTROL

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.

B. AMCA Certification: Fans shall comply with AMCA 11 and bear the AMCA-Certified Ratings Seal.

C. Fan Sound Ratings: Comply with AMCA 311, and label fans with the AMCA-Certified Ratings Seal. Sound ratings shall comply with AMCA 301. The fans shall be tested according to AMCA 300.

D. Fan Performance Ratings: Comply with AMCA 211 and label fans with AMCA-Certified Rating Seal. The fans shall be tested for air performance – flow rate, fan pressure, power, fan efficiency, air density, speed of rotation, and fan efficiency – according to AMCA 210/ASHRAE 51.

E. Operating Limits: Classify according to AMCA 99.

F. UL Standards: Power ventilators shall comply with UL 705. Power ventilators for use for restaurant kitchen exhaust shall also comply with UL 762.

PART 3 - EXECUTION

3.1 INSTALLATION OF HVAC POWER VENTILATORS

A. Install power ventilators level and plumb.

B. Ceiling Units: Suspend units from structure; use steel wire or metal straps.

C. Install units with clearances for service and maintenance.

3.2 DUCTWORK CONNECTIONS

A. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections per manufacturer requirements.

3.3 ELECTRICAL CONNECTIONS

A. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

B. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

C. Install electrical devices furnished by manufacturer, but not factory mounted, according to NFPA 70 and NECA 1.

3.4 CONTROL CONNECTIONS

A. Install control and electrical power wiring to field-mounted control devices.

3.5 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Verify that shipping, blocking, and bracing are removed.
2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
3. Verify that there is adequate maintenance and access space.
4. Verify that cleaning and adjusting are complete.
5. Remove and replace malfunctioning units and retest as specified above.

B. Test and adjust controls and safeties. Controls and equipment will be considered defective if they do not pass tests and inspections.

END OF SECTION

SECTION 238239.19 – WALL AND CEILING UNIT HEATERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes wall and ceiling heaters with propeller fans and electric-resistance heating coils.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include rated capacities, operating characteristics, furnished specialties, and accessories.

1.3 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

PART 2 - PRODUCTS

2.1 DESCRIPTION

A. Assembly including chassis, electric heating coil, fan, motor, and controls. Comply with UL 2021.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 CABINET

A. Front Panel: Stamped-steel louver, with removable panels fastened with tamperproof fasteners.

B. Finish: Baked enamel over baked-on primer with manufacturer's standard color selected by Architect, applied to factory-assembled and -tested wall and ceiling heaters before shipping.

C. Surface-Mounted Cabinet Enclosure: Steel with finish to match cabinet.

2.3 COIL

A. Electric-Resistance Heating Coil: Nickel-chromium heating wire, free from expansion noise and 60-Hz hum, embedded in magnesium oxide refractory and sealed in corrosion-resistant metallic sheath. Terminate elements in stainless-steel, machine-staked terminals secured with stainless-steel hardware, and limit controls for high-temperature protection. Provide integral circuit breaker for overcurrent protection.

2.4 FAN AND MOTOR

A. Fan: Aluminum propeller directly connected to motor.

B. Motor: Permanently lubricated. Comply with requirements in Section 230513 "Common Motor Requirements for HVAC Equipment."

2.5 CONTROLS

A. Controls: Unit-mounted integral thermostat.

B. Electrical Connection: Factory wire motors and controls for a single field connection with disconnect switch.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install wall and ceiling unit heaters to comply with NFPA 90A.

B. Install wall and ceiling unit heaters level and plumb.

C. Install wall-mounted thermostats and switch controls in electrical outlet boxes at heights to match lighting controls. Verify location of thermostats and other exposed control sensors with Drawings and room details before installation.

D. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

E. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

END OF SECTION

SECTION 26 05 00 – BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Base Bid:

1. Electrical Contractor Provide:

a. Conduit complete with supports, fittings, boxes and accessories for the following systems:

1) All power / lighting wiring 120V and above.
2) All control wiring 120V and above.
3) Data Cabling.

a) Include Conduit and Stub Ups.

4) Other systems as noted on the drawings.

b. Wire, cable and devices for the following systems:

1) All power / lighting.
2) Data cabling.

a) CAT 6 (underground flooded cell rated cable)

1.2 RELATED WORK

A. Specified elsewhere:

1. Any bidding requirements, bid and contract forms, supplemental general conditions, general and special conditions, and general requirements which may be included in other portions of this specification shall apply to this portion of the work.

a. Section 26 05 53 “Electrical Identification.”

1.3 DEFINITIONS

A. The term “Provide” shall include such labor, material, methods, equipment and transportation or other facilities required to complete the Contract, and the performance of all duties thereby related to the complete installation of the described topic.

1.4 CODE COMPLINACE

A. Comply with the listed applicable codes including but not limited to the following:

1. IBC International Building Code (2012)
2. NFPA 70; National Electrical Code, NEC (2014)
3. Illinois Accessibility Code; IAC (Latest Edition)
4. NFPA 101, Life Safety Code (2015)
5. IFC International Fire Code (2012)
6. IECC International Energy Conservation Code (2015)

1.5 QUALITY ASSURANCE

A. Only new, clean and unused perfect equipment, apparatus, materials and supplies shall be utilized during the course of the project.

B. All materials shall be new, without blemish, and shall bear a nationally recognized testing laboratory (NRTL) label. All approved material shall be installed according to manufacturer's specifications or as directed by the project Architect / Engineer. All material installation shall fully comply with recognized standards of NFPA, NEMA, ASTM, IEEE, ANSI and ASHREA.

1.6 CUTTING, PATCHING AND REPAIRING

A. The Contractor shall be fully responsible for all cutting, patching and repairing of areas required or disturbed by said contractor's installation. The Contractor shall patch, repair, or replace any surfaces, materials, or equipment / devices damaged or defaced by his/her work. Contractor shall provide cutting, patching and repair / replacement work required to bring the disturbed area back to original pre-construction conditions.

B. The Contractor shall obtain approval from the Architect / Engineer prior to the placement of any penetrations or sleeves through any main support beams, fire walls, foundations, exterior walls, or existing finished areas.

C. The Contractor shall provide touch-up painting to area affected by cutting, patching and demolition.

1. Thoroughly clean damaged areas and provide primer, intermediate and finish coats to suit the degree of damage created at each location.
2. Follow paint manufacturer's written instructions for surface preparation and for timing application of successive coats.

1.7 FIRE STOPPING / SEALING

A. Seal penetrations of fire-rated walls, floors or ceilings by raceways for compliance with NEC Article 300.21. Fill void around raceway. Sleeves shall be heavy wall steel pipe, anchored to building construction and finished plug with wall or ceiling. Fire stop material must be NRTL listed.

1. Manufacturers:

    a. Dow Corning Silicon RTV Foam
    b. Chase Technology Corp. Fire Resistant Foam Sealant
    c. 3M Fire Barrier
    d. T & B Fire Barrier
    e. Nelson Flameseal

1.8 FIELD CORRECTIONS AND/OR CHANGES

A. Contractor shall accurately record all as-built and field directed changes on a field set of construction set drawings. Any deviations in locations of conduits, wiring / cabling, devices or equipment shall be recorded and safe kept for turn over to the Engineer at completion of project.

B. Contractor shall be fully responsible for all accurate field constructed final conditions being reflected on "As-built" field prints. Contractor shall be held responsible and retainage withheld until all final field conditions are recorded to the satisfaction of the Engineer and owner.

1. Provide (One) original "As-built" set and (One) copy of the "As-built" prints for Engineers use at completion of the project.

PART 2 - PRODUCTS

2.1 RIGID STEEL CONDUIT (THIN WALL -EMT)

A. General: standard trade sizes, marked with manufacturer's name or trademark.

B. Material: mild steel, hot dipping galvanized or electro-galvanized with enamel coating.

C. Size: 1/2 inch minimum.

D. Manufacturer: Republic, LTV, Triangle, Allied.

E. Use limitation: not permitted underground, slab on grade or where subject to severe mechanical or chemical hazard or wet areas.

F. NOTE: MC Cable is not allowed.

2.2 GALVANIZED RIGID STEEL CONDUIT (HEAVY WALL -GRS)

A. General: standard trade sizes, marked with manufacturer's name or trademark.

B. Material: steel, galvanized.

C. Size: 3/4 inch minimum.

D. Manufacturer: Republic, LTV, Triangle, Allied.

E. Use limitation: only where approved or where shown on drawings. Install for all exterior vertical and horizontal runs where exposed to light and general hazard as well as wet exterior locations. Install in mechanical areas where subjected to damage or severe environmental conditions. Install where transitioning from beneath floor (PVC Conduit) directly into equipment. The GRS transition shall take place beneath the floor or grade.

2.3 FLEXIBLE STEEL CONDUIT

A. General: standard trade sizes, marked with manufacturer's name or trademark.

B. Material: steel, hot-dipped galvanized coating.

C. Size: 1/2 inch minimum.

D. Manufacturer: Triangle, American Flexible Conduit Co., Inc., Anaconda Metal Hose, Alflex Inc.

E. Use limitation: as defined by NEC Article 348. Other Applications: only where approved or where shown on drawings. Install for all interior equipment connections requiring non-static mounting or equipment subject to vibration or movement.

F. NOTE: MC Cable is not allowed.

2.4 FLEXIBLE LIQUIDTIGHT CONDUIT

A. General: standard trade sizes, marked with manufacturer's name or trademark.

B. Material: steel, galvanized with outer liquid-tight jacket and integral grounding strip.

C. Manufacturer: Panamet "Sealtite Type U.S.," Electri-Flex Co. "Liquatite Type L.A.". O-Z/Gedney, Triangle, Anaconda Metal Hose.

D. Use limitation: as defined by NEC Article 350. Other Applications: only where approved or where shown on drawings. Install for all exterior equipment connections between Horizontal and Vertical run GRS conduits or exterior mounted junction boxes. Install for all exterior equipment connections requiring non-static mounting or equipment subject to vibration or movement.

2.5 SURFACE DECORATIVE METAL RACEWAY

A. General: standard trade sizes, marked with manufacturer's name or trademark.

B. Material: steel, standard manufacturer's color.

1. Color shall be pre-approved by Engineer / Architect.

C. Manufacturer: Wiremold, Unicom, Mono Systems.

D. Use limitation: as defined by NEC Article 386. Other Applications: only where approved or where shown on drawings. Install for any surface interior equipment locations and installations where concealed raceway is not possible. Surface decorative metal raceway shall be utilized only after all other raceway installation possibilities have been eliminated.

2.6 RIGID NON-METALLIC CONDUIT

A. General: standard trade sizes, marked with manufacture's name or trademark.

B. Material: Polyvinyl Chloride Conduit (PVC), Schedule 40, Gray.

C. Size: 3/4 inch Minimum.

D. Use limitation: as defined by NEC Article 352. Other Applications: only where approved or where shown on drawings. Install for any underground horizontal exterior equipment locations. If turning up out of grade – transition to Galvanized Rigid Steel as required in section 2.2.

2.7 CONDUIT FITTINGS

A. Electrical Metallic Tubing Fittings and Conduit Bodies:

1. Connectors: steel compression type. Provide insulated throat type when noted on drawings.
2. Couplings: steel compression type.
3. Unilets (Conduit bodies): malleable iron.
4. Manufacturers: Raco, EFCOR, T&B, Allied.

B. Rigid, and Unilets (Conduit Bodies):

1. Locknuts: steel or malleable iron.
2. Bushings: insulating or metallic insulated type.
3. Couplings: threaded malleable iron.
4. Unilets (conduit bodies): malleable iron.
5. Manufacturers: Appleton, O.Z. Gedney, Raco.

C. Flexible Conduit Fittings:

1. Connectors: steel or malleable iron. Squeeze clamp type for non-jacketed conduit.
2. Connectors: steel or malleable iron compression type for liquid-tight conduit. (Provide insulated throat type, O-rings, external ground lugs or strain relief fittings where noted on drawings or required by N.E.C.).
3. Manufacturers: Appleton, Raco, T&B

D. Rigid Non-Metallic Conduit Fittings and Bodies:

1. Connectors: PVC quick connect type, One piece.
2. Couplings: PVC quick connect type, One piece.
3. Threaded adapters: PVC quick connect type, One piece.
4. Manufacturers: Appleton, Raco, T&B, Carlon

2.8 600 VOLT CLASS WIRE AND CABLE

A. Single Conductor Type THHN/THWN:

1. Conductor: Copper, Class B Stranded.
2. Insulation: Polyvinylchloride.
3. Jacket: Nylon
4. Use limitation: Dry, Damp and Wet locations.

B. Multi-conductor Control Cable Type EPR:

1. Conductor: Copper, Class B Stranded.
2. Insulation: Ethylene propylene rubber.
3. Jacket: Polyvinylchloride, flame retardant and low temperature.
4. Use limitation: Damp and Wet locations.

C. Class 2 Control Circuits: Type THHN-THWN in raceway, and/or stranded Multi-conductor, Power-limited cable, in raceway.

D. Data Communications Cable:

1. 4 Pr. / 100 Ohm (8 conductor) #24 AWG copper, solid. Cat 6.
2. Twisted pairs. Flooded cell type, fully rated for wet location.
3. NFPA 70, Types CMG and CMP
4. Comply with TIA/EIA-568-B.2
5. Jacket Color: Black.

2.9 CONDUCTOR / CABLE MANUFACTURERS

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

1. Alcan Products Corporation; Alcan Cable Division.
2. Alpha
3. American Insulated Wire Corp.; a Leviton Company.
4. Bleden
5. Cablec
6. General Cable Corporation.
7. Senator Wire & Cable Company.
8. South West Cable
9. Southwire Company.
10. Triangle
11. West Penn
12. Anixter Wire and Cable

2.10 MINIMUM CONDUCTOR SIZE

A. No. 12 AWG for power and lighting wiring.

B. No. 18 -14 AWG for control wiring.

C. No. 24-22 for communications / Data.

D. Other industry standard gauge sizes as specifically called for on the drawings or recommended by system manufacturers.

2.11 CONDUCTOR COLOR CODE

A. Color Coding of conductors in accordance with the following table:

	CONDUCTOR COLOR CODING			
SYSTEM	Phase A	Phase B	Neutral	Ground
120/240V	Black	Red	White	Green

2.12 JOINTS, SPLICES, TERMINATIONS- CONDUCTORS / CABLES

A. Make terminations in No. 10 AWG and smaller with ring or fork tongue crimp terminals with insulation support or grip. On No. 8 AWG and larger use hypress indent type or mechanical solderless lugs.

B. Make splices or joints in No. 10 AWG and smaller with insulated spring compression connectors such as wing nuts or equal. On No. 8 AWG and larger use hypress indent type sleeves, split bolt connectors or equal and cover with insulating tape or heat shrinkable insulation equivalent to 150% of conductor insulation.

C. Manufacturers: Blackburn, Panduit, T&B, 3M, Burndy, Anderson, Ideal, Amp.

2.13 PULL AND JUNCTION BOXES

A. NEMA 1 Locations:

1. Material: Steel, enameled inside and out over phosphatized surfaces or galvanized. Flat, removable covers fastened with screws.

B. NEMA 3R Locations:

1. Material: Galvanized steel, enameled inside and out. Drip shield top and seam free sides, front and back. Cover to fasten security with captive screws or draw pull latches.

C. NEMA 4 and 4X Locations:

1. Material: Galvanized steel, enameled inside and out. Seamfree sides, front and back. Cover to fasten securely with gasketed screws. Gasketed cover hinged type.

D. Manufacturers type 1,3R, 4 and 4X: Appleton, Adalet, Crouse-Hinds, Hoffman, Weigman.

E. Grade Mounted Handhole Type Junction / Pull box.

1. Material: Polymer Concrete

a. Impact Resistance: Tested per ASTM D-2444, load rated per ANSI / SCTE 77-2002
b. Comply with NFPA 70 (NEC) Article 314.30.
c. Corrosion Resistance: resistant to alkalines, acids, and weathering.
d. Non-flammable and Non-conductive
e. Gasketed top beveled cover imprinted with “Electric” or “Fiber” dependant on media contained.
f. Solid bottom construction with 2” weep holes.
g. Manufacturers: Strongwell (Quazite), Synertech, Christy Concrete Products, Highline or Newbasis.

F. Size all pull and junction boxes in accordance with the NEC or as noted on the drawings.

2.14 SUPPORTS

A. Individual Conduit Runs:

1. Galvanized or malleable one-hole straps.
2. Provide clamp backs in wet locations.
3. Galvanized conduit hanger with bolt (mineralac or equal).
4. Beam clamps or concrete anchors with threaded rod and “U” or ring type hangers.

B. Suspended Multiple Conduit Runs:

1. Trapeze hanger assemblies consisting of beam clamps or concrete anchors with galvanized threaded rod, Unistrut channel with split pipe clamps.
2. Same as above except with galvanized angle iron and “U” bolts in lieu of Unistrut and split pipe clamps.

C. Surface Multiple Conduit Runs:

1. Channel anchored to surface with split pipe clamps.

D. Allow 25% space capacity on all racks installed for multiple runs.

E. Anchoring:

1. Hollow Masonry: Toggle Bolts, expandable anchors.
2. Solid Masonry & Concrete: Lead expansion anchors, self-drilling, steel wedge and preset type anchors.
3. Metal: Beam clamps, machine bolt, welded studs and sheet metal screws.
4. Wood: Wood screws.
5. Others: As noted or detailed on the drawings.

PART 3 - EXECUTION

3.1 CONDUIT INSTALLATION

A. Conduit shall be cut square and threaded with an approved conduit threader. Conduit ends shall be reamed of burrs, and all metal shavings and cutting lubricants shall be removed before conduit is connected to the conduit system.

B. Conduit bends shall be made with conduit bending machine to avoid changing the internal diameter of the conduit and not damage its protective coating either inside or outside.

C. When conduit runs exceed 150 feet of straight conduit or have more than the equivalent of 270 degrees total bends, pull fitting or junction boxes shall be installed.

D. Install expansion fittings where conduits cross building expansion joints or where required in long conduit runs for thermal expansion and contraction. Bonding straps shall be installed around all conduit expansion fittings to provide ground path continuity.

E. Conceal conduit wherever possible or run exposed as noted or shown on drawings. Where exposed, conduit shall be installed parallel to or at right angles to walls, columns, etc. Exposed diagonal conduit will not be permitted.

F. Conduits shall be installed at least 12 inches from un-insulated hot water piping.

G. In NEMA I areas, fasten conduit to boxes and cabinets with two locknuts and one bushing unless noted otherwise on drawings.

H. Conduits shall be supported from the structural portion of the building. Conduits will not be allowed to be supported from ductwork, pipes or ceiling suspension system.

3.2 WIRE AND CABLE INSTALLATION

A. Do not pull cable or wire in raceway until conduit system is complete. Use pulling lubricant that is compatible with insulation and covering of cable and conductors and that is recommended by wire manufacturer.

B. Make conductors continuous from outlet to outlet. Splices shall be made in outlet or junction boxes only. All feeder cables shall be continuous from origin to termination without intermediate splices unless specifically noted otherwise on drawings or approved in writing by the A/E.

C. During pulling operations, exercise care not to exceed the manufacturer’s listed pulling tension or conductor sidewall load.

D. Identify each cable or conductor at each end and in junction boxes, troughs, etc., with a permanent self-laminating label with suitable letters or numbers for each identification.

E. Leave minimum of six-inch ends or loops at each outlet box for connection to fixture or device.

F. Install all conductors in raceways or open is listed as low voltage control data/voice.

1. Note: All ceiling cavities are non-plenum construction.
2. Use of non-plenum conductors is allowed.

G. Coordinate install of low-voltage cabling. Building lighting automation and data/phone cabling may be installed open above suspended / accessible ceilings without raceway.

3.3 PULL JUNCTION BOX INSTALLATION

A. Support all boxes independently of the conduit system.

B. Plug all unused openings with appropriate threaded or snap in plugs.

3.4 DEVICES

A. Install all devices level and plumb.

B. Refer to all mounting heights as referenced on drawings or other portions of the specification.

END OF SECTION

SECTION 26 05 26 – GROUNDING AND BONDING

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Base Bid:

1. Electrical Contractor provide:

a. Grounding and Bonding of electrical equipment, materials and accessories as specified herein and as shown on the plan documents.

1.2 RELATED WORK

A. Specified Elsewhere:

1. Section 26 27 26 – Wiring Devices.
2. Section 26 56 00 – Exterior Lighting.

1.3 SUBMITTALS

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

1.4 QUALITY ASSURANCE

A. 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.

B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.

2.2 CONNECTORS

A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.

2.3 GROUNDING ELECTRODES

A. Ground Rods: Copper; 5/8 inch by 8 feet in length. (Site Lighting Pole Bases)

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Stranded type. Insulated interior of conduit.

B. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.

3.2 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:

1. Feeders and branch circuits.
2. Lighting circuits.
3. Receptacle circuits.
4. Flexible raceway runs.
5. Exterior Lighting Pole Bases.

3.3 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.

1. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.

3.4 FIELD QUALITY CONTROL

A. Perform the following tests and inspections and prepare test reports:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal.

a. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.

b. Perform tests by fall-of-potential method according to IEEE 81.

B. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity 200 kVA and Less: 10 ohms.

C. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect/Engineer promptly and include recommendations to reduce ground resistance.

END OF SECTION

SECTION 26 05 53 – IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Base Bid:

1. Electrical Contractor Provide:

a. Electrical Identification of equipment, material, and accessories as specified herein and as-shown on the plan documents.

1.2 RELATED WORK

A. Specified Elsewhere:

1. Section 260500 – Basic Materials and Methods.

1.3 QUALITY ASSURANCE

A. Comply with ANSI A13.1.

1.4 COORDINATION

A. Coordinate identification names, abbreviations, colors, and other features with requirements in the Contract Documents, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual, and with those required by codes, and standards. Use consistent designations throughout Project.

PART 2 - PRODUCTS

2.1 CONDUCTOR / RACEWAY IDENTIFICATION MATERIALS

A. Conductor Marker Tape: Vinyl or vinyl -cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

B. Buried Raceway Marker / Danger Tape: Yellow with Black lettering polyethylene tape at least 6” wide, with standard “CAUTION – BURIED ELECTRIC LINE” imprinted on each side. Install marker / danger tape in trench at 6” below grade or as indicated on drawings. Provide #12 tracer wire integral with marking tape.

2.2 EQUIPMENT IDENTIFICATION MATERIALS

A. Equipment Labels: Thermoplastic, heavy gauge, self-adhesive type, with equipment name or identification tag machine engraved by micro-mill or equivalent process.

1. Provide custom labels for all newly installed panels, enclosures and special system assembly cabinets.

PART 3 - EXECUTION

3.1 APPLICATION

A. Auxiliary Electrical Systems Conductor and Cable Identification:

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and cable pull points. Identify by system and circuit designation.
2. Use system of designations that is uniform and consistent with system used by manufacturer for factory-installed connections.

3.2 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing or interception without interference with operation and maintenance of equipment or supporting electrical devices.

C. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

D. Color-Coding for Phase and Voltage Level Identification, 600 V and Less: Use the colors listed below for ungrounded branch-circuit conductors.

1. Color shall be factory applied for branch circuits. Feeder circuits shall be phase taped at both line and load ends.
2. Colors for 240/120-V Circuits:

a. Phase A: Black.
b. Phase B: Red.
c. Neutral: White.
d. Ground: Green.

END OF SECTION

SECTION 26 09 23 – LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Contractor Provide.

1. Base Bid.

a. Switchbox-mounted occupancy and vacancy sensors operating as Standalone Room Devices.

B. Related Requirements:

1. Section 26 27 26 "Wiring Devices" for wall-box dimmers and manual light switches.

1.2 SUBMITTALS

A. Product Data: For each type of product.

1.3 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.4 WARRANTY

A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace lighting control devices that fail(s) in materials or workmanship within specified warranty period.

1. Warranty Period: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 INDOOR WALL VACANCY CONTROL SENSORS

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

1. Cooper Industries, Inc.
2. Hubbell Building Automation, Inc.
3. Leviton Manufacturing Co., Inc.
4. Lithonia Lighting; Acuity Brands Lighting, Inc.
5. Sensor Switch, Inc. (Basis of Design) # WSX-PDT

B. General Requirements for Sensors:

1. Wall-mounted, solid-state indoor occupancy sensors.
2. Dual technology.
3. Integrated power pack.

4. Hardwired connection to switch.
5. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
6. Operation:

    a. Vacancy Sensor: Unless otherwise indicated, manual on by occupant, turn lights off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 5 to 20 minutes.

7. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A.
8. Power: Line voltage.
9. Power Pack: Dry contacts rated for 20A LED load at 120- and 277V ac, for 13A tungsten at 120V ac, and for 1 hp at 120V ac. Sensor has 24V dc, 150mA, Class 2 power source, as defined by NFPA 70.
10. Mounting:

    a. Sensor: Suitable for mounting in any position on a standard outlet box.
    b. Relay: Externally mounted through a 1/2-inch knockout in a standard electrical enclosure.
    c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.

11. Indicator: Digital display, to show when motion is detected during testing and normal operation of sensor.
12. Bypass Switch: Override the "on" function in case of sensor failure.

C. Dual-Technology Type: Wall mounted; detect occupants in coverage area using PIR and ultrasonic detection methods. The particular technology or combination of technologies that control on-off functions is selectable in the field by operating controls on unit.

1. Sensitivity Adjustment: Separate for each sensing technology.
2. Detector Sensitivity: Detect occurrences of 6-inch-minimum movement of any portion of a human body that presents a target of not less than 36 sq. in., and detect a person of average size and weight moving not less than 12 inches in either a horizontal or a vertical manner at an approximate speed of 12 inches/s.
3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. when mounted on a 96-inch-high ceiling.
4. Detection Coverage (Room, Wall Mounted): Detect occupancy anywhere within a 180-degree pattern centered on the sensor over an area of 1000 square feet when mounted 48 inches above finished floor.

2.2 CEILING SENSORS

A. Indoor Occupancy Sensors: Shall be powered directly from the lighting control power supply (Low Voltage) or directly connected to line voltage. Units powered with a standalone power supply shall control lighting in spaces as indicated on the plans.

1. Dual-Tech PIR and Microphonics monitoring for movement in space.
2. Minimum of 800 sq ft of coverage.

3. Ceiling Mounted.
4. Color: White.

2.3 SEQUENCE OF OPERATION:

1. Enter the room, user manually turns on lights at station.
2. Lights come up to full brightness.
3. Motion activity (dual-tech) keeps lights on while occupied.
4. Person leaves the area, can turn off the lights manually or after 15 minutes, lights automatically turn off.

2.4 CONDUCTORS AND CABLES

A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Section 260500 "Basic Materials and Methods."

B. Dimming and low voltage connections: 2/c or 4/c #20 cable with insulation rated for 300V minimum. Installation in same raceway with 120 lighting circuits.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1.

B. Examine lighting control devices before installation. Reject lighting control devices that are wet, moisture damaged, or mold damaged.

C. Install and aim sensors in locations to achieve not less than 90-percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

D. Set all standalone occupancy and vacancy sensors to a delay time of 15 minutes. Area lighting after vacancy stays on for 15 minutes minimum.

3.2 WIRING INSTALLATION

A. Wiring Method: Comply with Section 26 05 00 "Basic Materials and Methods." Minimum conduit size is 3/4 inch.

B. Size conductors according to lighting control device manufacturer's written instructions unless otherwise indicated.

3.3 IDENTIFICATION

A. Identify components and power and control wiring according to Section 26 05 53 "Electrical Identification."

3.4 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Operational Test: After installing time switches and sensors, and after electrical circuitry has been energized, start units to confirm proper unit operation.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Lighting control devices will be considered defective if they do not pass tests and inspections.

3.5 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting lighting control devices to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

1. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit Owner's operations.

3.6 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain lighting control devices.

END OF SECTION

SECTION 26 24 16 - PANELBOARDS

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Contractor Provide.

1. Base Bid.

a. Main Service Entry Panelboard containing Main Breaker and bonded neutral / ground bus.
b. Lighting and appliance branch-circuit panelboards.

1.2 DEFINITIONS

A. MCCB: Molded-case circuit breaker.

B. MCB: Main Circuit Breaker.

1.3 SUBMITTALS

A. Product Data: For each type of panelboard.

B. Shop Drawings: For each panelboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details.
2. Detail enclosure types including mounting and anchorage, environmental protection, knockouts, corner treatments, covers and doors, gaskets, hinges, and locks.
3. Detail bus configuration, current, and voltage ratings.
4. Short-circuit current rating of panelboards and overcurrent protective devices.
5. Include evidence of NRTL listing for series rating of installed devices.
6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.5 FIELD CONDITIONS

A. Service Conditions: NEMA PB 1, usual service conditions, as follows:

1. Ambient temperatures within limits specified.
2. Altitude not exceeding 6600 feet.

1.6 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace panelboards that fail in materials or workmanship within specified warranty period.

1. Panelboard Warranty Period: 1 year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PANELBOARDS COMMON REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NEMA PB 1.

C. Comply with NFPA 70.

D. Enclosures: Surface-mounted, dead-front cabinets.

1. Rated for environmental conditions at installed location.

a. Indoor Dry and Clean Locations: NEMA 250, Type 1.

2. Height: 84 inches maximum.
3. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box. Trims shall cover all live parts and shall have no exposed hardware.

E. Incoming Mains Location: Convertible between top and bottom, or as indicated on schedules.

F. Phase, Neutral, and Ground Buses: Hard-drawn copper, 98 percent conductivity.

G. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Material: Hard-drawn copper, 98 percent conductivity.
2. Main and Neutral Lugs: Mechanical type, with a lug on the neutral bar for each pole in the panelboard.
3. Ground Lugs and Bus-Configured Terminators: Mechanical type, with a lug on the bar for each pole in the panelboard.
4. Feed-Through Lugs: Mechanical type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.

a. See Schedule for requirements.

H. NRTL Label: Panelboards shall be labeled by an NRTL acceptable to authority having jurisdiction.

I. Future Devices: Panelboards shall have mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.

J. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals. Assembly listed by an NRTL for 100 percent interrupting capacity.

2.2 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

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

1. Eaton.
2. General Electric Company; GE Energy Management - Electrical Distribution.
3. Siemens Energy.
4. Group Schneider (Square “D”)

B. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.

C. Mains: Lugs only or Main breaker type, refer to panel schedules for requirements in in panel.

D. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

E. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.

2.3 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. MCCB: Comply with UL 489, with interrupting capacity] to meet available fault currents.

1. GFCI Circuit Breakers: Single-pole configurations with Class A ground-fault protection (6-mA trip).
2. MCCB Features and Accessories:

a. Standard frame sizes, trip ratings, and number of poles.
b. Breaker handle indicates tripped status.
c. UL listed for reverse connection without restrictive line or load ratings.
d. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
e. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and HID lighting circuits.
f. Handle Clamp: Loose attachment, for holding circuit-breaker handle in on position.

2.4 IDENTIFICATION

A. Panelboard Label: Manufacturer's name and trademark, voltage, amperage, number of phases, and number of poles shall be located on the interior of the panelboard door.

B. Breaker Labels: Faceplate shall list current rating, UL and IEC certification standards, and AIC rating.

C. Circuit Directory: Directory card inside panelboard door, mounted in transparent card holder.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1.

B. Install panelboards and accessories according to NECA 407.

C. Mount top of trim 80 inches above finished floor unless otherwise indicated.

D. Mount panelboard cabinet plumb and rigid without distortion of box.

E. Install overcurrent protective devices and controllers not already factory installed.

F. Make grounding connections and bond neutral for services and separately derived systems to ground. Make connections to grounding electrodes, separate grounds for isolated ground bars, and connections to separate ground bars.

G. Install filler plates in unused spaces.

1. NOTE: CONTRACTOR SHALL NOT REMOVE ALL FILLER PLATES. ONLY REMOVE FILLER PLATES AS NEEDED TO ACCOMMODATE BREAKERS PER SCHEDULE. IF ALL FILLER PLATES ARE FOUND REMOVED FOR CONVIENIENCE, CONTRACTOR WILL REPLACE DEAD FRONTS.

H. Arrange conductors in gutters into groups and bundle and wrap with wire ties.

3.2 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; install warning signs complying with requirements in Section 26 05 53 "Electrical Identification."

B. Create a directory to indicate installed circuit loads; incorporate Owner's final room designations. Obtain approval before installing. Handwritten directories are not acceptable. Install directory inside panelboard door.

C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 26 05 53 "Electrical Identification."

D. Device Nameplates: Label each branch circuit device in power panelboards with a nameplate complying with requirements for identification specified in Section 26 05 53 "Electrical Identification."

E. Provide label of available fault current. Install on front of unit. Comply with NEC requirements Article 110.24. Provide pre-manufactured label (orange) with caution wording.

1. Engineer will provide Line to Line and Line to Ground Fault Current Values to Contractor for labeling.

3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Acceptance Testing Preparation:

1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

C. Tests and Inspections:

1. Perform visual and mechanical inspection of panels and physical operation of all components prior to energizing.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

D. Panelboards will be considered defective if they do not pass tests and inspections.

END OF SECTION

SECTION 26 27 26 – WIRING DEVICES

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Electrical Contractor Provide.

1. Base Bid.

a. Straight-blade tamper resistant, convenience receptacles.
b. Tamper resistant GFCI receptacles.
c. Tamper resistant USB receptacles.
d. Toggle switches.
e. Wall Box dimmers.
f. Wall plates.

1.2 DEFINITIONS

A. Abbreviations of Manufacturers' Names:

1. Cooper: Copper Wiring Devices; Division of Cooper Industries, Inc.
2. Hubbell: Hubbell Incorporated: Wiring Devices-Kellems.
3. Leviton: Leviton Mfg. Company, Inc.
4. Pass & Seymour: Pass& Seymour / Legrand.
5. Acuity: Acuity Brands / Lithonia Lighting

1.3 SUBMITTALS

A. Product Data: For each type of product.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

PART 2 - PRODUCTS

2.1 GENERAL WIRING-DEVICE REQUIREMENTS

A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NFPA 70.

C. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions:

1. Connectors shall comply with UL 2459 and shall be made with stranding building wire.
2. Devices shall comply with the requirements in this Section.

D. Devices for Owner-Furnished Equipment:

1. Receptacles: Match plug configurations.

E. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.2 STRAIGHT-BLADE RECEPTACLES

A. Duplex, Tamper Resistant, Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596.

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

a. Eaton / Cooper (Arrow Hart).
b. Hubbell Incorporated; Wiring Device-Kellems.
c. Leviton Manufacturing Co., Inc.
d. Pass & Seymour/Legrand (Pass & Seymour).

2.3 GFCI RECEPTACLES

A. General Description:

1. Duplex, Tamper Resistant, 125V, 20A, straight blade, non-feed-through type.
2. Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, UL 943 Class A, and FS W-C-596.
3. Include indicator light that shows when the GFCI has malfunctioned and no longer provides proper GFCI protection.
4. For Exterior locations, provide GFCI device rated “Weather Resistant”.
5. Where shown as a “WP” device, provide weather proof in use type enclosure.
6. USB type: Where shown as a “USB” device, provide duplex receptacle with (2) two integral USB charging ports: Basis of Design: Hubbell # USB8300IV, or equal.

B. Duplex GFCI Convenience Receptacles:

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

a. Eaton / Cooper (Arrow Hart).
b. Hubbell Incorporated; Wiring Device-Kellems.
c. Leviton Manufacturing Co., Inc.
d. Pass & Seymour/Legrand (Pass & Seymour).

2.4 TOGGLE SWITCHES

A. Comply with NEMA WD 1, UL 20, and FS W-S-896.

B. Switches, 120/277 V, 20 A:

1. Single Pole, and Three-way:

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

1) Eaton / Cooper (Arrow Hart).
2) Hubbell Incorporated; Wiring Device-Kellems.
3) Leviton Manufacturing Co., Inc.
4) Pass & Seymour/Legrand (Pass & Seymour).

2.5 WALL-BOX DIMMERS

A. Dimmer Switches: Modular, full-wave, solid-state units with integral, quiet on-off switches, with audible frequency and EMI/RFI suppression filters.

B. Control: Continuously adjustable slider; with single-pole or three-way switching. Comply with UL 1472.

C. LED Lamp Dimmer Switches: Modular; compatible with LED lamps; trim potentiometer to adjust low-end dimming; capable of consistent dimming with low end not greater than 10 percent of full brightness. (0-10V where standalone devices are required).

2.6 WALL PLATES

A. Single and combination types shall match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
2. Material for Finished Spaces: Stainless Steel, SS #302 with satin finish..
3. Material for Unfinished Spaces: Galvanized steel.
4. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in wet and damp locations.

B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant, die-cast aluminum with lockable cover.

C. Provide in-use type covers for all exterior mounted receptacles. Basis of design: Hubbell-Bell # MX4280Z or equal.

2.7 FINISHES

A. Device Color:

1. Wiring Devices Connected to Normal Power System: Ivory.
2. WP in use type covers. Black, or clear.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.

B. Coordination with Other Trades:

1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
4. Existing Conductors:

    a. Cut back and pigtail, or replace all damaged conductors.
    b. Straighten conductors that remain and remove corrosion and foreign matter.
    c. Pigtailing existing conductors is permitted, provided the outlet box is large enough.

D. Device Installation:

1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.

8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles down, and on horizontally mounted receptacles to the right.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Dimmers:

1. Install dimmers within terms of their listing.
2. Install neutral conductors on line and load side of dimmers according to manufacturers' device listing conditions in the written instructions.

H. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on bottom. Group adjacent switches under single, multigang wall plates.

I. GFCI Receptacles: Install non-feed-through-type GFCI receptacles where protection of downstream receptacles is not required.

3.2 FIELD QUALITY CONTROL

A. Test Instruments: Use instruments that comply with UL 1436.

B. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.

C. Perform the following tests and inspections:

1. Tests for Convenience Receptacles:

a. Line Voltage: Acceptable range is 105 to 132 V.
b. Test tamper resistant feature of each outlet, inspect for damage or incorrect operation.
c. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
d. Ground Impedance: Values of up to 2 ohms are acceptable.
e. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
f. Using the test plug, verify that the device and its outlet box are securely mounted.

g. Tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.

D. Wiring device will be considered defective if it does not pass tests and inspections.

END OF SECTION

SECTION 26 51 19 – LED INTERIOR LIGHTING

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Contractor Provide.

1. Base Bid.

a. Interior and Exterior solid-state luminaires that use LED technology.
b. Lighting fixture supports.

B. Related Requirements:

1. Section 26 09 23 "Lighting Control Devices" for automatic control of lighting, including photoelectric relays and vacancy / occupancy sensors.

1.2 DEFINITIONS

A. CCT: Correlated color temperature.

B. CRI: Color Rendering Index.

C. Fixture: See "Luminaire."

D. IP: International Protection or Ingress Protection Rating.

E. LED: Light-emitting diode.

F. Lumen: Measured output of lamp and luminaire, or both.

G. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.3 SUBMITTALS

A. Product Data: For each type of product, arranged by designation.

B. Shop Drawings: For nonstandard or custom luminaires.

1. Include plans, elevations, sections, and mounting and attachment details.
2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include diagrams for power, signal, and control wiring.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.5 WARRANTY

A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.

B. Warranty Period: Two year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LUMINAIRE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Recessed Fixtures: Comply with NEMA LE 4.

C. CRI of minimum 80. CCT of 3500 K. (Note: typical color temperature shall be 3500K, in some instances, CCT is specified as other than 3500K. See Fixture Schedule for required CCT).

D. Rated lamp life of 50,000 hours.

E. Lamps dimmable from 100 percent to 10 percent of maximum light output.

F. Internal driver.

G. Controls integral with fixtures for on-off, dimming as listed on the fixture schedule.

1. Coordinate with Section 26 09 23 “Lighting Control Devices”.

H. Nominal Operating Voltage: 120V ac.

1. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.

I. Emergency Battery Power Backup.

1. Where schedules indicate emergency operation, provide fixtures with the following:

a. 90-minute sealed, maintenance free, lead-acid type battery integral to fixture.
b. Push to test button.
c. Pilot light indicating power on and system ready.
d. Relay: transfer power to the inverter / battery system from normal source.
e. Comply with UL / NTRL listings for luminaires with integrated emergency power source operation.

J. Housings:

1. Extruded-aluminum or steel housing and heat sink.
2. Powder-coat finish.

K. Manufacturers: Subject to compliance with requirements, available manufacturers (family of products) offering products that may be incorporated into the Work include, but are not limited to the following:

1. Contractor may offer as equals to the specified fixture schedule, products by one of the following manufacturers. Contractor shall take full responsibility for insuring compliance with the specification, insuring products are of equal or greater quality and insuring control systems will operate with selected fixtures. Being listed as an acceptable fixture manufacturer by no means guarantees acceptance of the "equal" package.

a. Cooper Lighting, an Eaton business.
b. Lithonia Lighting; Acuity Brands Lighting, Inc. – (Basis of Design)
c. OSRAM SYLVANIA
d. Philips
e. Hubbell Lighting.
f. Williams

2.2 DOWNLIGHT

A. Minimum 1000 lumens. Minimum allowable efficacy of 80 lumens per watt. See Schedule.

B. Universal mounting bracket.

C. Integral junction box with conduit fittings.

D. Damp location listed for installation in showers where indicated.

2.3 RECESSED LINEAR

A. Minimum 4,000 lumens. Minimum allowable efficacy of 85 lumens per watt.

B. Integral junction box with conduit fittings.

2.4 STRIP LIGHT

A. Minimum 2000 lumens. Minimum allowable efficacy of 75 lumens per watt.

B. Integral junction box with conduit fittings.

2.5 BAY LIGHTING

A. Minimum 15,000 lumens. Minimum allowable efficacy of 75 lumens per watt.

B. Integral junction box with leads pulled out back of fixture.

C. Aircraft cable "V" hangers, support from ceiling. "Gripple" is acceptable for adjustable hanging.

D. .125 Polycarbonate lens (clear).

E. Color: White, Gray or Black acceptable.

2.6 EXIT SIGNS

A. Internally Lighted Signs: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.

1. Lamps for AC Operation: LEDs, 70,000 hours minimum rated lamp life.
2. Edge Lit, Aluminum finish, clear polycarbonate face. Single or Dual-Face, Red Lettering.
3. Integral 90-Minute sealed, maintenance free, lead-acid battery pack.
4. Wall or ceiling-mount adaptable.
5. Self-Diagnostics Electronics.

2.7 EMERGENCY LIGHTING UNITS

A. Description: Self-contained units complying with UL 924.

1. Battery: Sealed, maintenance-free, lead-acid type.
2. Charger: Fully automatic, solid-state type with sealed transfer relay.
3. Operation: Relay automatically turns lamp on when power supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
4. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
5. LED Indicator Light: Indicated normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
6. Lamps: LED type per fixture schedule.
7. Self-diagnostics.
8. Wall mount or ceiling mount as listed on the schedule.

2.8 MATERIALS

A. Metal Parts:

1. Free of burrs and sharp corners and edges.
2. Sheet metal components shall be steel unless otherwise indicated.
3. Form and support to prevent warping and sagging

B. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

C. Diffusers, and Globes:

1. Prismatic acrylic or clear, UV-stabilized acrylic
2. Acrylic: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
3. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.

D. Housings:

1. Extruded-aluminum housing and heat sink.
2. Clear powder-coat or painted finish.

2.9 METAL FINISHES

A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

2.10 LUMINAIRE SUPPORT COMPONENTS

A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.

C. Wires: ASTM A 641/A 641 M, Class 3, soft temper, zinc-coated steel, 12 gage.

D. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.

E. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1.

B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.

C. Install lamps, LEDs and Drivers in each luminaire. Some Luminaires may require remote mounting of the LED Driver or addressable control module. Contractor shall review requirements for each fixture and shall be fully responsible for complete installation.

D. Supports: Sized and rated for luminaire weight.

E. Flush-Mounted Luminaire Support: Secured to outlet box.

F. Wall-Mounted Luminaire Support:

1. Attached to structural members in walls or attached using through bolts and backing plates on either side of wall.
2. Do not attach luminaires directly to gypsum board.

G. Ceiling-Grid-Mounted Luminaires:

1. Secure to any required outlet box.
2. Secure luminaire using approved fasteners in a minimum of two locations, spaced near corners of luminaire.
3. Additionally support all troffers to structure above using two additional support wires from two opposite corners.

H. Comply with requirements in Section 26 05 00 "Basis Materials and Methods" for wiring connections.

I. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 26 05 53 "Electrical Identification."

3.2 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.

2. Test operation with motion control devices and addressable lighting control systems in which form a system with the lighting provided.

B. Luminaire will be considered defective if it does not pass operation tests and inspections.

C. Prepare test and inspection reports in conjunction with the addressable lighting control package programming scheme.

END OF SECTION

SECTION 26 56 00 – EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Base Bid:

1. Contractor Provide:

a. LED Luminaires and Lamps.
b. Round, Tapered, Decorative, Aluminum Poles.
c. Round, Straight, Aluminum Poles.
d. Concrete Pole Bases.
e. Associated mounting materials and accessories.

1.2 RELATED WORK

A. Specified Elsewhere:

1. Section 03 30 00 “Cast-in-Place Concrete.”

1.3 STRUCTURAL ANALYSIS CRITERIA FOR POLE SELECTION

A. Dead Load: Weight of luminaire and its horizontal and vertical supports and supporting structure, applied as stated in AASHTO LTS-4.

B. Ice Load: Load of 3 lbf/sq. ft., applied as stated in AASHTO LTS-4.

C. Wind Load: Pressure of wind on pole and luminaire, calculated and applied as stated in AASHTO LTS-4.

1. Wind speed for calculating wind load for poles 50 feet or less in height is 110 mph.

1.4 SUBMITTALS

A. Product Data: For each luminaire, pole, and support component, arranged in order of lighting unit designation. Include data on features, accessories, and finishes.

B. Retain paragraph below if foundation-mounted poles are indicated.

C. Shop Drawings: Include anchor-bolt templates keyed to specific poles and certified by manufacturer.

D. Operation and Maintenance Manuals.

1.5 QUALITY ASSURANCE

A. 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.

B. Comply with IEEE C2, "National Electrical Safety Code."

C. Comply with NFPA 70, 2014 Edition.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In Exterior Lighting Device Schedule where titles below are column or row headings that introduce lists, the following requirements apply to product selection:

1. Provide product by the acceptable manufacturers listed.

a. See Lighting Fixture Schedule. No Equals.

2.2 LUMINAIRES, GENERAL REQUIREMENTS

A. Luminaires shall comply with UL 1598 and be listed and labeled for installation in wet locations by an NRTL acceptable to authorities having jurisdiction.

B. Comply with IESNA RP-8 for parameters of lateral light distribution patterns indicated for luminaires.

C. Metal Parts: Free of burrs and sharp corners and edges.

D. Sheet Metal Components: Corrosion-resistant aluminum, unless otherwise indicated. Form and support to prevent warping and sagging.

E. Housings: Rigidly formed, weather- and light-tight enclosures that will not warp, sag, or deform in use. Provide filter/breather for enclosed luminaires.

F. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position. Doors shall be removable for cleaning or replacing lenses. Designed to disconnect ballast when door opens.

G. Exposed Hardware Material: Stainless steel.

H. Plastic Parts: High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

I. Light Shields: Metal baffles, factory installed and field adjustable, arranged to block light distribution to indicated portion of normally illuminated area or field.

J. Reflecting surfaces shall have minimum reflectance as follows, unless otherwise indicated:

1. White Surfaces: 85 percent.
2. Specular Surfaces: 83 percent.
3. Diffusing Specular Surfaces: 75 percent.

K. Lenses and Refractors Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.

L. Luminaire Finish: Manufacturer's standard paint applied to factory-assembled and -tested luminaire before shipping. Where indicated, match finish process and color of pole or support materials. Black – standard.

2.3 DRIVER FOR LED LAMPS

A. Driver: Electronic type, Class 1.

1. Voltage: 120-277, +/- 10 percent.
2. Drive Current: 350-700mA Add (+/- 5 percent).
3. Frequency: 60 Hz.
4. Power Factor: > 95 percent at full load.
5. THD: < 10% at full load.
6. Load regulation: +/- 1 percent from no load to full load.
7. Output ripple: <10 percent.
8. Case Temperature: rated for –40 degrees C through +80 degrees C
9. Overheat protection: self-limiting short circuit protection and overload protected.
10. Primary Fused.
11. Life rating of not less than 70,000 hrs.

2.4 LED LAMPS

A. LED (Light Emitting Diode) lamping. Light bars as specified per fixture schedule.

B. Minimum efficacy of 75 lumens per watt.

C. Standard Color Temperature: 4000K.

D. CRI: Greater than 70.

2.5 POLES AND SUPPORT COMPONENTS, GENERAL REQUIREMENTS

A. Structural Characteristics: Comply with AASHTO LTS-4.

1. Wind-Load Strength of Poles: Adequate at indicated heights above grade without failure, permanent deflection, or whipping in steady winds of speed indicated in Part 1 "Structural Analysis Criteria for Pole Selection" Article, with a gust factor of 1.3.
2. Strength Analysis: For each pole, multiply the actual equivalent projected area of luminaires and brackets by a factor of 1.1 to obtain the equivalent projected area to be used in pole selection strength analysis.

B. Luminaire Attachment Provisions: Comply with luminaire manufacturers' mounting requirements. Use stainless-steel fasteners and mounting bolts, unless otherwise indicated.

C. Mountings, Fasteners, and Appurtenances: Corrosion-resistant items compatible with support components.

1. Materials: Shall not cause galvanic action at contact points.
2. Anchor Bolts, Leveling Nuts, Bolt Caps, and Washers: Hot-dip galvanized after fabrication, unless stainless-steel items are indicated.
3. Anchor-Bolt Template: Plywood or steel.

D. Concrete Pole Foundations: Cast in place, with anchor bolts to match pole-base flange. Concrete, reinforcement, and formwork are specified in Section 03 30 00 "Cast-in-Place Concrete." Install per details as provided on the plan documents.

1. Contractor shall vibrate all pole bases to mitigate “Honeycombing” effect. Failure to properly vibrate and form pole bases to detail and proper installation standards shall subject the pole base to possible replacement.

2.6 DECORATIVE ALUMINUM POLES

A. Poles: Seamless, extruded structural tube complying with ASTM B 429/B 429M, Alloy 6063-T6 with access handhole in pole wall.

B. Poles: ASTM B 209, 5052-H34 marine sheet alloy with access handhole in pole wall.

1. Shape: Round, tapered, decorative. 10-inch Diameter. 25 feet tall.
2. Mounting Provisions: Butt flange for bolted mounting on foundation.

C. Grounding and Bonding Lugs: Welded 1/2-inch threaded lug, complying with requirements in Section 26 05 26 "Grounding and Bonding," listed for attaching grounding and bonding conductors of type and size listed in that Section, and accessible through handhole.

D. Brackets for Luminaires: Detachable, with pole and adapter fittings of cast aluminum. Adapter fitting welded to pole and bracket, then bolted together with stainless-steel bolts.

1. Tapered oval cross section, with straight tubular end section to accommodate luminaire.
2. Finish: Same as luminaire, Black.

E. Aluminum Finish: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Class I, Color Anodic Finish: AA-M32C22A42/A44 (Mechanical Finish: medium satin; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 611.

a. Color: Black.

2.7 STANDARD ALUMINUM POLES

A. Poles: Seamless, extruded structural tube complying with ASTM B 221, Alloy 6061-T6, with access handhole in in pole wall.

1. Shape: Round, straight.
2. Mounting Provisions: Butt flange for bolted mounting on foundation or breakaway support.

B. Brackets for Luminaires: Detachable, cantilever, without underbrace.

1. Adaptor fitting welded to pole, allowing the bracket to be bolted to the pole-mounted adapter, then bolted together with stainless-steel bolts.
2. Cross Section: Tapered oval, with straight tubular end section to accommodate luminaire. Match pole material and finish.

C. Grounding and Bonding Lugs: Bolted 1/2-inch threaded lug, complying with requirements in Section 260526 "Grounding and Bonding for Electrical Systems," listed for attaching grounding and bonding conductors of type and size listed in that Section, and accessible through handhole.

D. Fasteners: Stainless steel, size and type as determined by manufacturer. Corrosion-resistant items compatible with support components.

1. Materials: Compatible with poles and standards as well as to substrates to which poles and standards are fastened and shall not cause galvanic action at contact points.
2. Anchor Bolts, Leveling Nuts, Bolt Caps, and Washers: Hot-dip galvanized after fabrication unless otherwise indicated.

E. Handhole: Oval shaped, with minimum clear opening of 2-1/2 by 5 inches, with cover secured by stainless-steel captive screws.

F. Powder-Coat Finish: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" recommendations for applying and designating finishes.

1. Surface Preparation: Clean surfaces to comply with SSPC-SP 1 to remove dirt, oil, grease, and other contaminants that could impair powder coat bond. Grind welds and polish surfaces to a smooth, even finish. Remove mill scale and rust, if present, from uncoated steel, according to SSPC-SP 5/NACE No. 1 or SSPC-SP 8.
2. Powder coat shall comply with AAMA 2604.

    a. Electrostatic applied powder coating; single application with a minimum 2.5- to 3.5-mils dry film thickness; cured according to manufacturer's instructions. Coat interior and exterior of pole for equal corrosion protection.
    b. Color: As selected by Architect from manufacturer's full range.

2.8 POLE ACCESSORIES

A. Base Covers: Manufacturers' standard metal units, arranged to cover pole's mounting bolts and nuts. Finish same as pole.

B. Mounting hardware for stingers and luminaires.

PART 3 - EXECUTION

3.1 LUMINAIRE INSTALLATION

A. Install lamps in each luminaire.

B. Fasten luminaire to indicated structural supports.

1. Use fastening methods and materials selected to resist seismic forces defined for the application and approved by manufacturer.

C. Adjust luminaires that require field adjustment or aiming.

3.2 POLE INSTALLATION

A. Align pole foundations and poles for optimum directional alignment of luminaires and their mounting provisions on the pole.

B. Clearances: Maintain the following minimum horizontal distances of poles from surface and underground features, unless otherwise indicated on Drawings:

1. Fire Hydrants and Storm Drainage Piping: 60 inches.
2. Water, Gas, Electric, Communication, and Sewer Lines: 10 feet.
3. Trees: 15 feet.

C. Concrete Pole Foundations: Set anchor bolts according to anchor-bolt templates furnished by pole manufacturer. Concrete materials, installation, and finishing requirements are specified in Section 03 30 00 "Cast-in-Place Concrete."

D. Foundation-Mounted Poles: Mount pole with leveling nuts, and tighten top nuts to torque level recommended by pole manufacturer.

1. Use anchor bolts and nuts selected to resist seismic forces defined for the application and approved by manufacturer.
2. Grout void between pole base and foundation. Use nonshrink or expanding concrete grout firmly packed to fill space.
3. Install base covers, unless otherwise indicated.

E. Raise and set poles using web fabric slings (not chain or cable). Contractor shall be fully responsible for any degradation of painted surfaces.

3.3 GROUNDING

A. Ground metal poles and support structures according to Section 26 05 00 "Basic Materials and Methods."

1. Install grounding conductor pigtail in the base for connecting luminaire to grounding system.

2. Connect to 5/8 inch Copper ground rod per mounting detail.

END OF SECTION

SECTION 31 22 19 – FINISH GRADING

PART 1 – GENERAL

1.1 WORK INCLUDES

A. Base Bid

1. General Contractor

a. Provide imported topsoil if needed
b. Excavate and backfill planting and lawn areas
c. Spread topsoil

1.2 RELATED WORK

A. Specified elsewhere

1. All related exterior improvement work.

1.3 QUALITY ASSURANCE

A. All work described in this Section is to be done by a firm specializing in such work with documented 5 years experience in similar work. The personnel of the firm shall be experienced in the work specified and shall work under the direction of a skilled foreman.

1.4 SUBMITTALS

A. Contractor submit

1. Location and representative ½ cu.ft. sample of topsoil for approval.
2. List of equipment selected to avoid excess soil compaction.

1.5 PROTECTION

A. Contractor is responsible to protect and avoid all existing above ground and underground utilities during construction operations. Repair of any utilities damaged by installation shall be the responsibility of the Contractor.

B. Contractor is responsible to protect all existing conditions including structures, pavement and plant material from damage during project installation and maintenance. Any damages occurring are the responsibility of the Contractor to replace, repair or compensate Owner for damages.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Topsoil

1. Imported to the site if on-site topsoil is not available or does not meet specifications.
2. Loamy soil from the A horizon soil profile of local prairie-type soils.
3. Organic content between 8 and 10 percent.
4. Free from roots, sticks, weeds, stones, etc. larger than 1 inch in dimension.
5. Entirely free of foreign material including construction waste, litter and contaminating products.
6. At least 90 percent must pass the 2.00 mm sieve.
7. pH between 6.0 and 8.0.

B. Plaza Lawn Soil

1. Soil Properties

a. 75% comprised of topsoil meeting the criteria of 2.1.A above.
b. 25% sand meeting the requirements of Section 1003.01.a.1, IDOT Standard Specifications.
c. Topsoil and sand to be thoroughly mixed off-site to result in a uniform mix.

PART 3 – EXECUTION

3.1 SCHEDULE OF WORK

A. Execute work

1. When subsoil grade is approved by Project Manager and all construction materials and debris have been removed from the site.
2. When ground is not frozen and temperatures are consistently above freezing.
3. When soil is relatively dry and friable to avoid clodding and compaction.

3.2 EXCAVATION AND TOPSOIL BACKFILL FOR PLANTS

A. Operations

1. Excavate for trees, shrubs, and plant beds according to dimensions shown on project plans.
2. Test excavated area for water percolation. If beds or tree pits do not adequately percolate as determined by the Owner's Representative, auger hole below the excavation to a depth determined necessary and backfill with pea gravel as shown on plan.
3. Back fill with approved topsoil (See Section 32 9300 – Plants) in 12" lifts compacting moderately to 80-90% compaction.
4. Dispose of excess or substandard excavated material off the site.

3.3 TOP SOILING

A. Subsoil Preparation

1. Till subsoil to a depth of minimum 4".

2. Remove all vegetative debris and stones larger than 1 inch in dimension.
3. Remove all foreign material including aggregate, construction waste, litter and contaminating products.
4. Make any necessary grade adjustments.
5. Till again if necessary to achieve a uniform 4" depth.
6. See Section 33 4616 – Subdrainage piping for Plaza Lawn gravel and tile system.

B. Depositing Top Soil

1. Deposit approved topsoil on the site.
2. Spread with light weight, lawn-scale equipment to avoid excess compaction.
3. Spread topsoil along curbs, sidewalks, fence, and other improvements with hand tools to avoid damage to the improvements.
4. All areas for sodding to have a minimum 6 inches of topsoil. East Lawn is to have 16” of special soil according to project plans and specifications.
5. Soil clods to be no greater than 1” in any dimension.

C. Finish Grading

1. Finish to lines and grades shown on the plans.
2. Surfaces to be smooth with no rises or wrinkles.
3. Slope all areas to drain away from structures and pavement unless indicated otherwise.
4. Grade to meet the elevations of surrounding pavement.
5. Leave site in a smooth, stable condition. Roll any powdered soils to stabilize.
6. Final compaction to be 80-90%.

3.4 CLEAN-UP

A. Leave site clean and free of debris. Repair any damage to the satisfaction of the Owner’s Representative.

END OF SECTION

SECTION 32 13 15 – SPECIAL CONCRETE

PART 1 – GENERAL

1.1 WORK INCLUDES

A. Base Bid

1. General Contractor provide and install

    a. Site Preparation
    b. Base Preparation
    c. Concrete Sidewalk
    d. Colored Concrete Pavement
    e. Concrete Borders
    f. Footings for Site Walls and Site Furnishings

2. Warranty

1.2 RELATED WORK

A. Specified elsewhere

1. All related exterior improvement work.

1.3 QUALITY ASSURANCE

A. All work described in this Section is to be done by a firm specializing in such work with documented 5 years experience in similar work. The personnel of the firm shall be experienced in the work specified and shall work under the direction of a skilled foreman.

1.4 SUBMITTALS

A. Product Data

1. Shop drawings for concrete foundations indicating rebar size and placement.
2. Concrete mix design.
3. 5’ x 5’ sample section(s) of tooled and broomed colored concrete. If not satisfactory, subsequent samples to be provided until sample is approved.

    a. Location of sample section(s) to be coordinated with Owner’s Representative.

1.5 PROTECTION

A. Contractor is responsible to protect and avoid all existing underground and above ground utilities during construction operations. Repair of any utilities damaged by installation is the responsibility of the Contractor.

B. Contractor is responsible to protect all existing conditions including structures, pavements, and plant material from damage during project installation and maintenance. Any damages occurring

are the responsibility of the Contractor to replace, repair or compensate Owner for damages.

1.6 WARRANTY

A. The Contractor to warranty work for one year from project acceptance. During this time if cracking, pitting, or other visual or functional impairment develops, Contractor to replace or repair the area to the satisfaction of the Owner.

1.7 REFERENCE

A. The Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, adopted April 1, 2016 and all subsequent amendments, referred herein as IDOT Standard Specifications.

B. The American Society for Testing and Materials (ASTM), current edition including all amendments.

PART 2 – PRODUCTS

2.1 PRODUCTS AND MATERIALS

A. Base Aggregate: CA-6 class B crushed stone meeting the requirements of Section 1004 Coarse Aggregate, IDOT Standard Specifications.

B. Concrete Materials

1. In accordance with Section 1020 - Portland Cement Concrete, Type SI, IDOT Standard Specifications.
2. Concrete aggregates conforming to ASTM C-33. The maximum size aggregate to be 1/5 of the narrowest dimension between sides of forms, 3/4 of the minimum clear distance between reinforcing bars, or 1/3 of the depth of slabs.
3. Water used in mixing concrete to be free from sewage, oils, acids, alkalines, salts, organics, or other deleterious materials. Water approved by Public Health Agencies for drinking may be accepted without being tested.

C. Steel reinforcement conforming to plans and Section 508. Reinforcement Bars and Section 1006.10 – Concrete Reinforcement Bars, Fabric, and Strand, IDOT Standard Specifications.

D. Concrete Color

1. SGS Integral Colors: Fine ground pure mineral pigments

a. Dark Redwood color #489 (1-25 lb. bag per cubic yard)
b. Modify color if necessary to obtain color approved by Landscape Architect. Specifically designed for coloring concrete as manufactured by Solomon Colors, 4050 Color Plant Road, Springfield, IL 62702 (t) 800-624-0261, www.solomoncolors.com or approved equal.

E. Concrete Sealer: Clear color in accordance with Section 1026, IDOT Standard Specifications.

F. Expansion Material: ½" thick asphaltic expansion material.

G. Joint Sealer: Standard joint sealer, color to match adjacent pavement.

PART 3 – EXECUTION

3.1 CONCRETE QUALITY

A. Unless otherwise specified, concrete to have a 28 day compressive strength of 4000 psi. Submit the mix design intended for use which has been proven by field test data or trial mixes.

B. All exterior concrete to contain an air-entrained admixture conforming to ASTM C-260 to achieve an air content of 5% to 8%. The mixture to be such that the concrete will work readily into the corners and angles of the forms and around the reinforcements with the method of placing employed on the work without permitting segregation of aggregate or excess free water.

C. Place a uniform thickness of base material to yield a finished thickness as shown on plans when compacted. The material shall be rolled to achieve a compaction density of 95% or as approved by Project Manager.

3.2 COLORED CONCRETE

A. Mix concrete with concrete color by redi-mix load. Batch mixers will not be allowed because uniform color cannot be assured. Color to match approved color sample.

B. Utilize Color Release Agent if required to achieve approved color sample.

C. Seal colored concrete according to manufacturer's instructions and "Section 3.12 – Concrete Sealing" noted below.

3.3 CONSTRUCTION METHODS

A. Concrete Installation

1. Before placing concrete, all equipment for mixing and transporting concrete to be clean, all debris and ice to be removed from formed areas, the forms to be thoroughly wetted or oiled, and reinforcing to be cleaned. If the forms are to be oiled, oiling shall be done prior to placement of reinforcing. Do not place concrete in water.
2. Job mixed concrete to be mixed in an approved mixer for a period of not less than one minute after all materials are in the mixer. Ready-mix concrete to be mixed and delivered in accordance with ASTM C-94.
3. Concrete to be conveyed to the place of final deposit by methods which will prevent segregation. Concrete that is contaminated, partially hardened, or re-tempered will not be used. Once started, concrete placement to be carried on as a continuous operation until a complete section is done. Concrete to be thoroughly consolidated by mechanical vibrators. Contact with the forms to be insured by spading.

3.4 CURING

A. Maintain concrete in a moist condition for at least 5 days after placement, except that for early high-strength concrete, provide moist curing for at least the first two days.

B. Place wetted burlap and polyethylene sheeting or curing membrane over concrete that has been finished, immediately after the water sheen is no longer visible on the concrete surface.

3.5 COLD AND HOT WEATHER REQUIREMENTS

A. Cold weather concreting to be performed in accordance with "Recommended Practice for Cold Weather Concreting" and/or the latest edition of the PCA publication entitled "Cold Weather Concreting". (PCA ST-94).

B. Hot weather concreting and curing to be performed in accordance with the latest edition of ACI 305, "Recommended Practice for Hot Weather Concreting".

3.6 FORMS

A. The design, engineering, and construction of formwork is the responsibility of the Contractor. Forms to be wood or metal, designed, fabricated, braced and maintained such that the finished concrete conforms to the true lines and dimensions specified in the plans. Forms to be tight and of sufficient rigidity to prevent distortion due to the pressure of the concrete and other construction loadings, including vibration.

B. The maximum deflection of facing forms reflected in concrete surfaces exposed to view to be no greater than 1/240 of the span between structural form members.

C. Forms to be removed in a manner to insure safety of the structure. Do not remove forms until concrete has acquired sufficient strength to safely support its weight and the load thereon.

3.7 REPAIR OF DEFECTIVE AREAS

A. Repair work on defective areas of all sizes to have prior approval by the Project Manager. Methods and procedures shall be in accordance with ACI 301, Chapter 9 except as modified herein.

B. As early as possible after the removal of the forms, patch any poor joints, voids, air pockets and minor honeycombs. Large areas of honeycomb and other weak areas to be chipped out with a light pneumatic chip-hammer.

C. Repair of all defects to be accomplished by first wetting the area followed by the application of a bonding grout consisting of one part cement and one part sand (passing the No. 30 sieve) mixed to the consistency of thick cream. The patching material to consist of one part of gray and white portland cement so proportioned with 2 1/2 parts of sand (passing the No. 30 sieve) and enough water to produce a workable mixture which, when in place and cured, will match the color and finish of adjacent concrete surface.

3.8 CONSTRUCTION JOINTS

A. Space construction joints along the length of the pavement, sidewalk, and border curbs as shown on plans.

B. Joints not indicated on the plans to be located to fit the pattern and design of the surface as determined by the Owner's Representative.

C. Joints to be hand tooled 1-1/2 inch deep. A 2" wide smooth border, straight and perpendicular to the joint is required where indicated on project plans and details.

D. Cut joints will not be allowed except in unit paver base slabs where they will not be visible.

3.9 EXPANSION JOINTS

A. Space expansion joints approximately every 30 feet along the length of the pavement, sidewalk, and curbs as shown on plans. Locate expansion joints along edges of all adjacent structures including building and site walls.

B. Joints not indicated on the plans to be located to fit the pattern and design of the surface as determined by the Owner's Representative.

C. Joints to be full depth and filled with 1/2 inch thick asphaltic coated expansion material to within 1/4 inch of the finished sidewalk surface.

D. Fill joints with joint sealer to meet adjoining concrete elevations.

3.10 EDGES

A. Tool all exposed edges with a 1/2-inch diameter round over and 2" wide smooth border.

3.11 SURFACE TEXTURE

A. Colored pavement, Sidewalk, and Concrete Border surfaces: Medium-broom surface with texture running perpendicular to the length of the border or direction of pedestrian/vehicular travel.

C. Footings for Walls and Site Furnishings: Exposed surfaces to be hand rubbed to achieve a smooth and uniform surface free of burrs, pits, and irregularities in color or texture.

3.12 CONCRETE SEALING

A. Seal all exposed concrete after 30 days of curing.

1. Clean surface thoroughly.
2. Spray or roll on concrete surfaces to achieve uniform and even coat. Allow to dry a minimum of 8 hours.
3. Apply second coat uniformly.

3.14 CLEAN-UP

A. Leave site clean and free of debris. Repair any damage to the satisfaction of the Owner's

Representative.

END OF SECTION

SECTION 32 15 00 – AGGREGATE SURFACING – GRAVEL BORDERS

PART 1 – GENERAL

1.1 WORK INCLUDES

A. Base Bid

1. General Contractor provide and install

a. Ground preparation
b. Impermeable membrane
c. Filter fabric
d. Gravel

2. Warranty

1.2 RELATED WORK

A. Specified elsewhere:

1. All related exterior improvement work.

1.3 QUALITY ASSURANCE

A. All work described in this Section is to be done by a firm specializing in such work with documented 5 years experience in similar work. The personnel of the firm shall be experienced in the work specified and shall work under the direction of a skilled foreman.

1.4 SUBMITTALS

A. Contractor shall provide

1. Five (5) pound sample of gravel.
2. Cut-sheet for filter fabric and impermeable membrane.

1.5 PROTECTION

A. Contractor is responsible to protect and avoid all existing underground and above ground utilities during construction operations. Repair of any utilities damaged by installation is the responsibility of the Contractor.

B. Contractor is responsible to protect all existing conditions including structures, pavement, and plant material from damage during project installation and maintenance. Any damages occurring are the responsibility of the Contractor to replace, repair or compensate Owner for damages.

1.6 WARRANTY

A. Contractor to warranty for one year from acceptance all material and work in this project.

1.7 REFERENCE DOCUMENTS

A. The Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, adopted April 1, 2016 and all subsequent amendments, referred herein as IDOT Standard Specifications.

PART 2 – PRODUCTS

2.1 PRODUCTS AND MATERIALS

A. Gravel: Smooth river gravel, 1½" to 2" diameter, light to medium tan earth-tone colors.

B. Impermeable membrane: 45 mil EPDM rubber liner sized to minimize seams.

C. Filter fabric

1. Needlepunched nonwoven geotextile composed of polypropylene fibers in accordance with Section 1080 Fabric Materials, IDOT Standard Specifications.
2. Mirafi 140NL as manufactured by TenCate Geosynthetics Americas, 365 South Holland Drive Pendergrass, Georgia 30567, (p) 706-693-2226 or approved equal.

PART 3 – EXECUTION

3.1 PREPARATION

A. Protection

1. Mark the location of all utilities at the site.
2. Stake the location of gravel borders as shown on plans and contact Owner's Representative for approval.
3. Provide safeguards to protect building walls, curbs, sidewalks and other improvements from possible damage during installation.

3.2 INSTALLATION

A. Ground Preparation

1. Core-out areas for gravel as shown on plans.
2. Excavate to precise lines and right angle edges.
3. Bottom and sides of excavation to be undisturbed earth or compacted to 90% density adjacent to curbs and 95% density adjacent to buildings. Gravel borders to drain away from building foundations.

B. Impermeable Membrane (adjacent to buildings only)

1. Cut ½" deep x ¼" wide channel on adjacent building at the finished grade elevation or use existing recessed brick mortar joint where possible.
2. Install membrane in cut or existing joint and place membrane down along the side of the building, across the bottom of the excavation, and fold over 18" into the soil.
3. Seal joint along channel to prevent water from flowing down building wall.

C. Geotextile Placement

1. Place fabric on top of the impermeable membrane or prepared sub-grade and extend up the vertical edges as shown on plans to separate gravel from adjacent mulch or soil.
2. Layout fabric to minimize seams or joinings. Where seams or joinings are necessary, overlap a minimum of 6 inches.

D. Gravel Placement

1. Place gravel in the prepared beds taking care not to dislodge or damage the geotextile fabric.
2. Rake gravel to form a level, uniform surface.

3.3 CLEAN-UP

A. Leave site clean and free of debris. Repair any damage to the satisfaction of the Owner's Representative.

END OF SECTION

SECTION 32 30 20 – WATER FEATURE

PART 1 – GENERAL

1.1 WORK INCLUDES

A. Base Bid

1. General Contractor provide and install

a. Complete Water Feature System including

(1) Water nozzles with wet wall back deflector
(2) Electronic control valve
(3) All piping, plumbing, and manual control valves necessary for a complete installation
(4) Drain channel and grate
(5) Push button activation

2. Preventative maintenance and post-installation service
3. Warranty

1.2 RELATED SECTIONS

A. Specified elsewhere

1. All related exterior improvement work.

1.3 QUALITY ASSURANCE

A. All work described in this Section is to be done by a firm specializing in such work with documented 5 years' experience in similar work. The personnel of the firm shall be experienced in the work specified and shall work under the direction of a skilled foreman.

1.4 SUBMITTALS

A. Qualifications and company information for the water feature installer.

B. System Design

1. Shop drawings of complete system design by installer showing all components and assembly using plan drawings or comparable products.

C. Product information for all proposed products.

D. Manufacturer's product warranties.

1.5 DELIVERY

A. Arrange for deliveries of products in accord with approved current construction schedules and in ample time for inspection prior to installation.

1.6 PROTECTION

A. Contractor is responsible to protect and avoid all existing underground and above ground utilities during construction operations. Repair of any utilities damaged by construction is the responsibility of the Contractor.

B. Contractor is responsible to protect all existing conditions including structures, pavement and plant material from damage during project installation and maintenance. Any damages occurring are the responsibility of the Contractor to replace, repair or compensate Owner for damages.

1.7 WARRANTY

A. Contractor shall warranty for a period of one year against defects in workmanship and operation of all working parts and systems.

B. Manufacturer's warranties also apply.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Water Nozzles

1. Aqua Storm SSR water runnel, 48" width, 6" nozzle length, black color.
2. 48 streams of water per linear foot at a rate of ¼ g.p.m. per inch (modified from standard ½ g.p.m. per inch).
3. Manufactured by the Great American Waterfall Company, 18755 Sakera Road, Hudson, FL 34667 888-683-0042, www.gawcinc.com or approved equal.

B. Control valve

1. One electronic, pressure controlled shut-off valve according to Section 32 8000 – Irrigation.
2. Manufactured by Rain Bird International Inc., 145 North Grand Avenue, Glendora, CA 91741, 626/963-4287, www.rainbird.com.

C. Plumbing Products

1. Plastic pipe: Rigid PVC Type I-SDR26 conforming to ASTM D2241 "Specification for PVC Plastic Pipe" Class 200.
2. Manual ball valves, in-line, sized for pipe and designed to control water flow.
3. Solvent Cement: ASTM D2564 for PVC pipe and fittings.

D. Drain Channel and Grate

1. PVC channel drains with mechanical interlocking joints, light gray color
2. Channel sections to be 19-11/16" L x 8¼" W x 7¼" H
3. Cast iron grate for use with 8" Pro Series channel, 19-11/16" L x 7-13/16" W x ¾" H.
4. Grate Opening to be 9/16" x 6-1/8"
5. 18.2 pounds each
6. 8" Pro Series Profile Channel Drain and 8" Pro Series grate as manufactured by NDS,

851 N. Harvard Ave. Lindsay, CA 93247, 1-800-726-1994. www.ndspro.com or approved equal.

E. Push Button Activation

1. See Electrical sheets and specifications for product information.

PART 3 – EXECUTION

3.1 INSTALLATION

A. General

1. As noted in the Quality Assurance section, water feature installation is to be done by a firm specializing in such work with documented 5 years experience in similar work. Such companies include

   a. Hydro Dramatics, 1228 S. 8th Street, St. Louis, MO 63104 314.231.9806 www.hydrodramatics.com
   b. Approved equal.

2. Installer must be able to provide preventative maintenance and post-installation service.

B. Water Nozzle

1. Install water nozzle as shown on project plans.
2. Nozzle to fit tight against granite veneer panels to insure water is deflected back onto the textured wall. Seal all joints to insure water runs down the face of the wall.

C. Plumbing

1. All plumbing shall be done to meet state and local plumbing and public health codes.
2. Place pipes and make joints as shown on plans.
3. Install flashing and sealant to insure all joints are sealed.
4. All water from the nozzles is to be directed onto the wall and into the drain channel at the base of the wall.

D. Control Valves

1. Install electronic control valve underground in valve box. Box to be flush with adjacent grade.
2. Manual valve (to adjust water flow to water wall nozzles) to be installed on the water service line downstream from the electronic control valve (in the valve box).

E. Push Button Activation

1. Install push button activation on the water wall according to electrical plans and specifications and at a height to comply with ADA requirements.

F. Electrical

1. All electrical work and service provided according to all state and local codes

G. Drain Channel and Grate

1. Install drain channel as indicated on project plans and according to manufacturer's recommendations.
2. Connect drain channel to nearby storm pipe, see Civil sheets.
3. Install grate according to manufacturer's instructions.

3.2 PREVENTATIVE MAINTENANCE AND POST-INSTALLATION SERVICES

A. Start-up

1. Make final adjustments to insure proper water flow and function of the system.
2. Initiate the first sequencing of the system and instruct the assigned operating and maintenance personnel in the care and operation of the system and adjustment of parts.

B. Maintenance

1. For one complete season (approximately May-September), contractor is to maintain the water feature to insure it is functioning at optimal performance.

C. Drain the system at the end of the first season and reactivate the system the following season. Coordinate with Owner's operating and maintenance personnel.

3.3 CLEAN-UP

A. Leave site clean and free of debris. Repair any damage to the satisfaction of the Owner's Representative.

END OF SECTION

SECTION 32 31 19 – DECORATIVE METAL FENCES AND GATES

PART 1 – GENERAL

1.1 WORK INCLUDES

A. Base Bid

1. Contractor provide and install

   a. Louvered Fence Panel System
   b. Double and Single Leaf Swing Gates

2. Warranty

1.2 RELATED SECTIONS

1. All related exterior improvement work.

1.3 QUALITY ASSURANCE

A. All work described in this Section is to be done by a firm specializing in such work with documented 5 years experience in similar work. The personnel of the firm shall be experienced in the work specified and shall work under the direction of a skilled foreman.

1.4 SUBMITTALS

A. Product Data

1. Submit printed materials indicating specified infill pattern design, spacing and component material sizes.

B. Shop Drawings – Fence/Gate Components

1. Submit shop drawings stamped by a Licensed Engineer covering erection instructions, expected loads, and details showing layout and location of all component parts. Post and panel sizes, clips, gates, gate hardware (including all sliding and swinging hardware required for a fully functioning system), attachment details, base plate requirements and fastener locations. Quantities and sizes shall be provided within these shop drawings for a complete package assembly.

C. Shop Drawings – Concrete Foundations

1. Submit shop drawings for concrete foundations indicating rebar size and placement.

D. Physical Product Samples

1. Provide one (1) sample for each panel type selected. Each sample is to be approximately 10" x 10" and coated with the specified finish system.

E. Manufacturer's product warranty.

1.5 PERFORMANCE REQUIREMENTS

A. Loading

1. Design and size components to withstand dead loads and live loads caused by positive and negative wind loads acting normal to the plane of enclosure including building corners in accordance with ASCE 7, BOCA and OSHA code requirements. Components are also sized in consideration of regional geographic wind characteristics.

B. TGIC Polyester Powder Coat Finish System

1. Epoxy pre-coat / Color Coat / TGIC Polyester Powder Coat Finish 20-Year Warranty System.

TGIC Polyester Powder Coat Finish System

Test Methods	Powder Properties	Requirement
		Final TGIC Coating
(Prime coat)	DuPont #ELH503S5	(Gray Morning)
(Test color coat)	DuPont # PFB-603-S9	(Bike Black)
(ASTM D5965-96,C	Specific Gravity	1.29 +/- 0.05
	Theoretical Coverage	1.49 ft 2/lb/mil
ASTM D3451-92, 13	Mass Loss During Cure	less than 1%
	Max. Storage Temp.	75 degrees F.

Test Methods	Coating Properties	Requirement
ASTM D523-89	Gloss at 60 percent	85+
DPC TM 10.219	PCI Powder Smoothness	8
ASTM D2454-95	Overbake Resistance, Time	100%
ASTM D3363-92a	Pencil Hardness	2H
ASTM D2794-93	Dir/Rev Impact, Gardner	160/160in/lbs
ASTM D3359-97	Adhesion, Cross Hatch	5Bpass
ASTM D522-93a	Flexibility, Mandrel	1/8"dia. no fracture
ASTM B117-97	Salt Spray	4,000 hours
UL DTOV2Org.	CoatingsSteel Enclosures, Electrical Equipment	Recognized Application
Electrostatic Spray, 300 degrees F.		Cure Schedule

	(Time at substrate temp.)
Pretreatment: White Metal Blast (2mil. Min.etch)	
Substrate: 0.032 in. CRS	10 Min. @ 400f.
Film Thickness	8.0-10.0 Mils

1.6 DELIVERY

A. Arrange for deliveries of products in accordance with approved current construction schedules and in ample time for inspection prior to installation.

1.7 PROTECTION

A. Contractor is responsible to protect and avoid all existing above ground and underground utilities during construction operations. Repair of any utilities damaged by construction shall be the responsibility of the Contractor.

B. Contractor is responsible to protect all existing conditions including structures, pavement and plant materials from damage during project construction. Any damages occurring shall be the responsibility of the Contractor to replace, repair or compensate Owner for damages to the satisfaction of the Owner.

1.8 WARRANTY

A. Contractor to warranty for a period of one (1) year against product failure and assembly and installation failure.

B. Manufacturer's warranty also to apply.

1.9 REFERENCE

A. The Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, adopted April 1, 2016 and all subsequent amendments, referred herein as IDOT Standard Specifications.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Louvered Screen Panel Fence

1. Fence post with standard fully welded flat plate cap sized and fabricated according to approved shop drawings.
2. Frame and posts to be steel according to manufacturer's recommendation. Louvered infill panels to be aluminum.
3. 100% view-blocking louvered panels

a. Main Bars: "formed louver" aluminum extrusions 6063-T6 or 6061-T6 (per ASTM B-221). Spacing: 1-7/8" on center
b. Crossbar: expanded 5/16" diameter tubular extrusions – centered in main bars (per ASTM B-210). Spacing 8" on center
c. Banding/Framing Bars: rectangular aluminum extrusions 6063-T6 or 6061-T6.

4. General size of fence panels detailed on project plans.
5. Swing gate to use louvered panels to match fence sections and be fabricated according to approved shop drawings.
6. Powder coated black color to be selected by project Architect.
7. BarnettBates Louver Style STL100 as manufactured by BarnettBates, www.barnettbates.com, 1-800-541-3912, 500 Mills Road, Joliet, IL 60433

B. Double and Single Leaf Swing Gates

1. Custom designed gate systems with posts, framing, hinged operation mechanism, and lockable hardware per approved shop drawings. Post to have fully welded flat plate cap.
2. Frame and posts to be steel according to manufacturer's recommendation. Louvered infill panels to be aluminum.
3. 100% view-blocking louvered infill panels

a. Louvered style STL100
b. Main Bars: "formed louver" aluminum extrusions 6063-T6 or 6061-T6 (per ASTM B-221). Spacing: 1-7/8" on center
c. Crossbar: expanded 5/16" diameter tubular extrusions – centered in main bars (per ASTM B-210). Spacing 8" on center
d. Banding/Framing Bars: rectangular aluminum extrusions 6063-T6 or 6061-T6.
e. General size of fence panels detailed on project plans.
f. Black powder coat color.

4. Provide stainless steel locking hardware for owner provided padlock hasp.
5. Black powder coat color.
6. Custom Swing Gate with BarnettBates Louver Style STL100 infill panels as manufactured by BarnettBates, www.barnettbates.com, 1-800-541-3912, 500 Mills Road, Joliet, IL 60433

2.2 FABRICATION

A. Furnish and install all concrete, rebar and anchor bolts required for gate post footings according to approved shop drawings.

B. Design, furnish and install all gate posts, bolts and structural members required to support panels and form a complete gate assembly.

1. Screen panel assembly to be designed and fabricated to avoid in-field drilling, cutting or other adjustments that would damage factory applied finish.

C. Fabricate all panels, posts, attachments, framing, and all supplied components per approved

detail shop drawings.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Preparation

1. Stake locations of all posts. Unless noted otherwise, posts are to be spaced according to manufacturer's recommendations.
2. Verify locations of utilities and other underground structures.
3. Install all fabricated components to meet applicable OSHA and Building Code loading requirements.

B. Louvered Screen Panel Fence

1. Install footings according to approved shop drawings and manufacturer's requirements.
2. Secure fence posts to concrete footings level and plumb according to plan and manufacturer's instructions.
3. Secure louvered screen panels to posts level and plumb according to plans and manufacturer's instructions.
4. Make final adjustments as necessary.

C. Double and Single Leaf Swing Gates

1. Install footings according to approved shop drawings and manufacturer's requirements.
2. Secure gate posts to concrete footings level and plumb according to plan and manufacturer's instructions.
3. Secure louvered screen panels and gate frame to posts level and plumb according to plans and manufacturer's instructions.
4. Drill hole in pavement to secure cane bolt or install lockable hardware ccording to project plans and manufacturer's instructions.
5. Make final adjustments for proper gate operation.

3.2 CLEAN-UP

A. Leave site clean and free of debris. Repair any damage to the satisfaction of the Owner's Representative.

END OF SECTION

SECTION 32 32 60 – SITE WALLS (Plaza and Seat Walls)

PART 1 – GENERAL

1.1 WORK INCLUDES

A. Base Bid

1. General Contractor provide and install

   a. Concrete Footing
   b. Geotextile Fabric
   c. Aggregate Backfill
   d. Standard Concrete Masonry Units
   e. Brick Veneer
   f. Cast Stone Veneer Panels
   g. Textured Granite Panels (water wall)
   h. Cast Stone Caps

2. Warranty

1.2 RELATED WORK

A. Specified elsewhere:

1. All related exterior improvement work.

1.3 QUALITY ASSURANCE

A. All work described in this Section is to be done by a firm specializing in such work with documented 5 years experience in similar work. The personnel of the firm shall be experienced in the work specified and shall work under the direction of a skilled foreman.

1.4 SUBMITTALS

A. Contractor shall submit for approval prior to beginning work

1. Shop drawings for concrete foundations indicating rebar size and placement.
2. Samples (4) of brick veneer, cast stone, and granite showing range in size, color and texture.
3. Shop drawings for all cast stone products.
4. Manufacturer's product warranty.

1.5 PROTECTION

A. Contractor is responsible to protect and avoid all existing above ground and underground utilities during construction operations. Repair of any utilities damaged by construction shall be the responsibility of the Contractor.

B. Contractor is responsible to protect all existing conditions including structures, pavement and plant material from damage during construction. Any damages occurring shall be the responsibility of

the Contractor to replace, repair or compensate Owner for damages.

1.6 WARRANTY

A. Contractor to warranty for a period of one (1) year against defects in workmanship and operation of all working parts and systems.

B. Manufacturer's product warranty.

1.7 REFERENCE

A. Illinois Department of Transportation Standard Specification for Roads and Bridge Construction adopted April 1, 2016, as amended referred herein as IDOT Standard Specifications.

PART 2 – PRODUCTS

2.1 PRODUCTS AND MATERIALS

A. Concrete for Footing

1. According to Section 32 1315 – Special Concrete.

B. Standard Concrete Masonry Units

1. Dimensions shown on plans.
2. In accordance with Section 1042 – Precast Concrete Products, IDOT Standard Specifications.

C. Brick Veneer

1. Comply with Facebrick ASTM Standard C216-15
2. Size: 3-5/8" wide by 2-1/4" high by 7-5/8" long
3. Brick Type: FBA, Red Bricks – Winewood Blend
4. Color: Winewood Blend
5. Texture: Antique Col (Handmade Appearance)
6. Manufactured by the Belden Brick Company, Canton, OH 44701-0910, 330-451-2031, www.beldenbrick.com

D. Cast Stone Veneer

1. Panel Dimensions: 3-5/8" thick by 40" height by 16" wide as indicated on plans.
2. Straight edge
3. Color: 18AC
4. Select cast stone panels to be engraved and color added to letters according to project plans and approved shop drawings.
5. Manufactured by Midwest Cast Stone, 1610 State Avenue, Kansas City, KS 66102 (p) 913-371-3300. www.midwestcaststone.com or approved equal.

E. Textured Granite Panels

1. Panel Dimensions: 3-1/16” thick by 40” height by 48” wide as indicated on plans.
2. Straight edge
3. Color: Lake Superior Green
4. Finish: Diamond 100
5. Provided by Coldspring, 17482 Granite West Road, Cold Spring, MN 56320, 1-800-328-5040, www.coldspringusa.com

F. Cast Stone Caps

1. Seat Walls: 3” thick by 16” wide, length as indicated on plan, 36” max.
2. Sign Walls: 3” thick by 18” wide, length as indicated on plan, 36” max.
3. Bullnose edges
4. Color: 18AC
5. Manufactured by Midwest Cast Stone, 1610 State Avenue, Kansas City, KS 66102 (p) 913-371-3300. www.midwestcaststone.com or approved equal.

G. Rebar: According to project plans and Section 1006 – Metals, IDOT Standard Specifications.

H. Mortar: A rich cement mixture for exterior application, tinted to match stone as approved by Owner's Representative.

I. Acrylic Sealer Sealer: Minimum 20% solids as recommended by manufacturer of masonry unit products.

J. Filler and caulk for limestone products: Flexible rubberized rope filler and rubberized caulk sealer manufactured for such purpose. Color of rope and caulk to match cast limestone products.

K. Weep tube or cotton wick: 3/8” diameter.

L. Anchor hardware

1. Stainless steel anchors and wall clips, ASTM A 666, Type 304 B.
2. Dowels and Pins Material: Stainless steel, ASTM A 276, Type 304

M. Geotextile Fabric

1. In accordance with Section 1080 Fabric Materials, IDOT Standard Specifications.
2. 6 oz. woven geotextile fabric, in widths to minimize the need for overlapping.

N. Aggregate: CA-6 and CA-7 crushed stone meeting the requirements of Section 1004 – Coarse Aggregate.

2.2 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, and handle to prevent damage to the products and materials.

PART 3 – EXECUTION

3.1 EXCAVATION

A. Excavate to dimensions needed for construction of footings and foundations. Soil at base of excavation to be undisturbed and compact. Ground found to be soft or to contain foreign material such as roots or debris will be over-excavated. Lifts of aggregate will be compacted as directed by and to the satisfaction of the Owner's Representative.

3.2 FOOTINGS, FOUNDATIONS AND BASES

A. According to approved shop drawings, plans, and specifications.

B. Place fabric on undisturbed or compacted sub-grade.

C. Place CA6 on fabric and compact to 95% density.

D. Securely set forms in place.

E. Secure reinforcement and tie in place.

F. Pour concrete and use vibrating devices to eliminate air pockets.

G. Cover and protect pours during curing.

H. Carefully hand-rubbed all visible surfaces with a stone and mortar slurry to remove burs and small voids and produce a smooth and even surface.

3.3 MASONRY INSTALLATION

A. General

1. Install according to approved shop drawings, plans, and specifications.
2. Lay units using best masonry practices.
3. Mortar joints to be 1/4 to 3/8 inch wide as shown on plan.
4. Install only quality units; reject all defective units.
5. Align units level, plumb, and true.

B. Cutting

1. Cut straight and clean lines using an abrasive or diamond blade where cuts are required.

C. Concrete Masonry Units

1. Install units in a running bond pattern as shown on drawings.
2. Fill cavities of blocks having rebar with mortar to secure according to structural engineer plans and details.
3. Securely install anchor hardware for brick veneer.

D. Brick Veneer and Cast Stone Panels

1. Lay brick in running bond pattern.
2. Select brick colors to result in uniform variations.
3. Install weep tubes or cotton wicks at base of wall and joints where water may accumulate.
4. Position cast stone panels as shown on project plans.
5. Rake mortar joints, concave.
6. Thoroughly rinse and clean the surface with a detergent masonry cleaner and water following the manufacturer's instructions.
7. Apply clear, flat acrylic sealer uniformly to cover exposed masonry surfaces without forming drops or runs as recommended by manufacturer.

E. Granite Panels

1. Install granite panels as shown on project plans.
2. Select panels to result in uniform variations.
3. Size or cut panels as necessary to accommodate water nozzles.
4. Joints between panels to be watertight.
5. Thoroughly rinse and clean the surface with a detergent masonry cleaner and water following the manufacturer's instructions.

F. Cast Stone Caps

1. Pin and mortar cap stones in place as shown on plans using at least two pins per cap.
2. Fill joints with rubber rope filler.
3. Seal joints with masonry caulk, color to match stone.

3.4 CLEAN-UP

A. Thoroughly clean masonry of all mortar residue and effects of construction.

B. Leave site clean and free of debris. Repair any damage to existing features to the satisfaction of the Owner's Representative.

END OF SECTION

SECTION 32 80 00 – IRRIGATION

PART 1 – GENERAL

1.1 WORK INCLUDES

A. Base Bid

1. General Contractor

a. Provide and install complete irrigation system.

2. Warranty

1.2 RELATED WORK

A. Specified elsewhere

1. All related exterior improvement work.

1.3 QUALITY ASSURANCE

A. All work described in this Section is to be done by a firm specializing in such work with documented 5 years experience in similar work. The personnel of the firm shall be experienced in the work specified and shall work under the direction of a skilled foreman.

1.4 SUBMITTALS

A. Prior to operations

1. Proposed system layout plan if deviations from construction plans are proposed.
2. Cut sheets for all components including backflow preventer, rain sensor, controller, shut-off valve, zone valves, irrigation heads, and quick couplers proposed for use.
3. Manufacturer’s product warranties.

B. Upon completion of operations

1. Two copies of User Manual to include:

a. As-built layout plan if deviations from construction plans were made.
b. Manufacturer's information, including instructions for operation and maintenance of system, and a manufacturer's parts catalog.
c. A schedule of time each valve must be open for various amounts of water, and for each controller station if different.

1.5 PROTECTION

A. Contractor is responsible to protect and avoid all existing underground and above ground utilities during construction operations. Repair of any utilities damaged by installation is the responsibility of the Contractor.

B. Contractor is responsible to protect all existing conditions including structures, pavement, and plant material from damage during project installation and maintenance. Any damages occurring are the responsibility of the Contractor to replace, repair or compensate Owner for damages.

1.6 WARRANTY

A. The Contractor to warranty for two full irrigation seasons, all the parts and labor in this project. Contractor to promptly provide all parts and repair needed to the satisfaction of the Owner's Representative.

B. Manufacturer's product warranties to apply.

1.7 REFERENCE DOCUMENTS

A. The Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, adopted April 1, 2016 and all subsequent amendments, referred herein as IDOT Standard Specifications.

PART 2 – PRODUCTS

2.1 PARTS

A. Backflow Preventor

1. Designed for 1-1/2" inflow and outflow and meet all state and local requirements.
2. Fabricated entirely from metal parts exclusive of component piping unless otherwise required.
3. Series LF909M1-Reduced Pressure Zone Assembly manufactured by Watts Regulator Company, 815 Chestnut St. North Andover, MA 01845-6098, www.watts.com or approved equal.

B. Controller

1. Plastic, locking, UV resistant, wall-mount case with 4 station base unit.
2. Rain Bird, ESP4ME Modular Timer with WiFi Compatibility or approved equal.

C. Rain Sensor

1. Rainbird WR2-RFC Wireless Rain/Freeze Sensor or approved equal.

D. Master and Isolation Valves

1. 2" manual ball valve fixed with a system blow-out tee as shown on plans.
2. Set in a below-ground valve box with gravel bottom.

E. Zone Shut-Off Valves

1. One below ground electronic shut-off valve for each zone as shown on plans.
2. Valves pressure controlled.

F. Irrigation Fixtures

1. Sprinklers, control valves, quick couplers and automatic controllers: manufactured by Rain Bird International Inc., 145 North Grand Avenue, Glendora, CA 91741, 626/963-4287, www.rainbird.com.

2.2 PIPE COMPONENTS

A. Plastic pipe: Rigid PVC Type I-SDR26 conforming to ASTM D2241 "Specification for PVC Plastic Pipe" Class 200.

B. Fittings for pipes 2 inches and smaller: Schedule 40 solvent weld type.

C. Solvent Cement: ASTM D2564 for PVC pipe and fittings.

2.3 ELECTRIC CONTROL WIRE

A. #18 gauge copper multi-conductor irrigation cable for direct burial. The neutral wire to be white.

2.4 BACKFILL FOR IRRIGATION TRENCHES

A. Fine textured soil free of stones, debris, clods of dirt, etc. Excavated material may be used if approved.

PART 3 - EXECUTION

3.1 UTILITIES AT SITE

A. New 1-1/2” water meter and tap to be made in restroom utility room as shown on plans.

B. A 120-volt electric service is provided at the controller location as shown on the plans.

3.2 COVERAGE DESIGN

A. Irrigation to be provided for turf and plant beds shown on the plan. All areas to receive head-to-head coverage, and head setting should achieve uniform coverage to the extent possible.

3.3 PREPARATION

A. Determine the location of all utilities at the site. Although utility locations are shown on the plan, these may not be accurate or complete.

B. Review layout of other project work which may affect irrigation layout.

C. Follow layout of irrigation lines shown on plans to the extent possible.

D. Protect structures, pavement, and plant material from possible damage during construction.

3.4 COMPONENT INSTALLATION

A. Irrigation Sleeves

1. Install PVC sleeves under pavements as shown on the plan. Clearly mark and cover pipe ends for later use.
2. Install warning tape on top of sleeve prior to backfilling.

B. Backflow Preventer

1. Install in location shown on the plan.
2. Install to meet local and state plumbing codes.
3. Measure water pressure at the outflow and advise Owner's Representative who will determine if any system redesign is required.

C. Controller

1. Mount in the restroom utility room as indicated on project plans.

D. Rain/Freeze Sensor

1. Install sensor on top of the restroom building where rain can freely fall according to manufacturer's instructions and Owner's Representative.
2. Mount interface next to the controller.

3.5 TRENCHING

A. Excavate trenches so that all pipes will be buried to the plan depth.

1. Main Irrigation Supply Line – 18" depth
2. Lateral Irrigation Line – 12" depth
3. Control zone wires – 12" depth

B. In the vicinity of existing structures and utilities, excavate by hand.

C. Pipe may be mechanically pulled, if conditions are proper and the method is authorized by the Owner's Representative prior to work.

D. Clear trench of stones, debris or sharp objects prior to placing pipe.

3.6 PIPING

A. Lay pipe in trench.

B. Cover open ends of pipe and fittings during construction.

C. Install warning tape on top of pipe prior to backfilling.

3.7 WIRING

A. Lay wire adjacent to the water lines.

B. Provide a one foot diameter loop at the connection with each control valve.

C. Band wire together in the trench with electricians tape every eight to ten feet. Snake wire in the trench with a 12 inch diameter loop at 100 foot intervals and at every change in direction to allow for contraction.

3.8 ZONE VALVES AND IRRIGATION HEADS

A. Install valves in underground vaults. Valves may be ganged where convenient.

1. Valve to provide make-up water for the water feature is to be installed as part of the irrigation system. See Specification Section 32 3020 – Water Feature for additional information.

B. Connect heads with swing arms or flexible pipe.

C. Set spray for optimum coverage.

3.9 CONNECTION WITH WATER SOURCE

A. Connect water lines to source and install water meter in accordance with all governing regulations.

3.10 CONNECTION WITH ELECTRIC SERVICE

A. Connect electric lines in accordance with all governing regulations.

3.11 SYSTEM TESTING

A. Test the main line up-stream from control valves for constant water pressure. Test for two hours at 100 psi. Pressure may drop no more than two pounds during the test period.

B. Test the lateral lines down-stream from control valves at available building system pressure for five hours. No water leakage may occur.

3.12 BACKFILL

A. Place the first 6-8 inches of backfill and thoroughly compact by hand as not to disturb the lay of the pipe and wire.

B. Continue backfilling in 6-8 inches lifts and thoroughly compact to avoid future settlement of the trenched areas.

C. Place 6” of approved topsoil as the top layer of backfill as specified in Section 32 93 00 – Plants.

3.13 SYSTEM DEMONSTRATION

A. Instruct Owner's personnel in the operation and maintenance of system and adjustment of parts.

3.14 START UP

A. Make final adjustments to insure complete coverage of the areas to be irrigated.

B. Initiate the first sequencing of the system and instruct the Owner's personnel in the care and operation of the system.

C. Drain the system at the end of the first season with the aid of Owner's personnel.

D. Reactivate the system the following season with the aid of Owner's personnel.

3.15 CLEAN-UP

A. Remove any excess material, debris and refuse from the site. Clean site improvements to remove any effects of construction. Repair any damage to existing features to the satisfaction of the Owner's Representative.

END OF SECTION

PART 1 – GENERAL

1.1 WORK INCLUDES

A. Base Bid

1. Contractor provide and install

    a. Soil preparation
    b. Fertilizer
    c. Sod

2. Turf Maintenance
3. Warranty

1.2 RELATED WORK

A. Specified elsewhere

1. All related exterior improvement work.

1.3 QUALITY ASSURANCE

A. All work described in this Section is to be done by a firm specializing in such work with documented 5 years experience in similar work. The personnel of the firm to be experienced in the work specified and shall work under the direction of a skilled foreman.

B. The sod producer to be a company specializing in sod production and harvesting with a minimum five years experience, and certified by the state from which the sod is grown.

1.4 SUBMITTALS

A. Prior to commencing work

1. Source and composition of sod.
2. Photographs and/or samples prior to shipment, if requested.

B. Upon completion of work

1. Tags from bags of fertilizer showing fertilizer nutrients, percentage of composition, and weights.

1.5 PROTECTION

A. Contractor is responsible to protect and avoid all existing underground and above ground utilities during construction operations. Repair of any utilities damaged by installation is the responsibility of the Contractor.

B. Contractor is responsible to protect all existing conditions including structures, pavement, and plant material from damage during project installation and maintenance. Any damages occurring are the responsibility of the Contractor to replace, repair or compensate Owner for damages.

1.6 WARRANTY

A. For a period of one year following project acceptance any areas of turf that become dead, dying or diseased is to be replaced to the satisfaction of the Owner's Representative. Replacement sod is to be laid following the same specifications as for the original installation. Contractor is to maintain the replaced sod for a period of one month at which time the success of replacement turf will be ascertained. Unsuccessful turf is to be replaced until successful.

PART 2 – PRODUCTS

2.1 PRODUCTS AND MATERIALS

A. Sod

1. Quality

a. Top quality, 12 to 18 month old rhizomatous turf-type fescue sod.
b. Dense with basil growth and full at the tops.
c. Free of weeds and non-turf growth, insects and disease, fungus and other conditions that indicate past, current or future conditions requiring special treatment or care.

2. Composition

a. 90% of seed comprised of 3 or more varieties of turf-type tall fescue include at least 1 variety of rhizomatous tall fescue: Labarinth (RTF) Tall Fescue, Barrington Tall Fescue and Barrera Tall Fescue.
b. 10% of seed comprised of 1 or more aggressive bluegrass varieties such as Barrister Kentucky Bluegrass.
c. Seed mixed, seeded and managed to result in sod with a uniform mix of grass varieties.

3. Harvesting

a. Cut grass between 2" and 3" before sod is cut.
b. Cut sod 1/4 to ½ inch thick in 20" by 40" pieces or other approved dimensions.
c. Comply with state and federal regulations including inspection for diseases and insects.

B. Pre-sod Fertilizer

1. Nutrients to be commercial nitrogen, phosphorus and potassium mixed in a 1:1:1 ratio of active ingredients and applied at a rate that will yield the number of actual nutrient pounds per acre as required.
2. Premixed in sacks each bearing a tag with the following information clearly printed: name and address of manufacturer, brand, weight, chemical composition and guarantee of analysis.

C. Post-seed Fertilizer

1. Nutrients: Commercial slow-release nitrogen, phosphorus and potassium mixed in a 2:1:1 ratio of active ingredients and applied at a rate which will yield the number of actual nutrient pounds per acre as required.
2. Premixed in sacks each bearing a tag with the following information clearly printed: name and address of manufacturer, brand, weight, chemical composition and guarantee of analysis.

2.2 DELIVERY, STORAGE AND HANDLING

A. Transport and handle sod to avoid physical damage and desiccation. Use protective covering.

B. At the site, keep sod in the shade and protect from the weather and mechanical damage. Keep sod moist at all times and exposed roots physically protected from dehydration and soil from forming a crust.

PART 3 – EXECUTION

3.1 TIME OF OPERATION

A. Install sod when the ground is in workable condition. Do not lay sod when the temperature will damage the turf during laying operations.

B. Contractor must provide equipment and labor for watering required until sod is established.

3.2 PREPARATION

A. Commence operations after giving a minimum 24 hours notice to Owner’s Representative.

B. Not more than 24 hours before sodding operations begin, work soil to a depth of 4" until it is smooth and free from debris, washes, gullies, and all soil clods greater than 1" in any dimension.

C. Remove all foreign material including sticks, stones, and construction debris including aggregate.

D. Soil along pavements, around drains and other edges where sod meets hard surfaces to be 1/2" below grades of adjoining hard surfaces.

E. Grade all areas to drain; no ponding of water will be allowed.

3.3 SODDING

A. Deliver sod in sufficient time and quantities to maintain the approved construction schedule and to assure that no sod is used which has been cut more than 24 hours in advance.

B. Spread fertilizer uniformly over the area to be sodded at the rate of 100 pounds of actual nutrient per acre (2.5 pounds per 1000 sq.ft.) and incorporated in the top 2" of soil.

C. Roll soil to achieve a smooth surface. Cover the area with sod before surface develops a crust.

D. Place sod on the ground with the longer dimension perpendicular to slopes, edges in contact with each other and adjacent hard surfaces, pieces neatly matched and joints of courses staggered. Lay sod within 4 feet of all tree trunks and 2 feet of all shrubs or shrub masses. Bury all exposed edges of sod flush with the adjacent soil.

E. Apply water uniformly at a rate of 5 gallons of water per square yard, within 1 hour after the sod has been laid. Provide all watering equipment necessary.

F. Roll sod thoroughly to provide close contact of sod with soil and to remove minor irregularities in the surface.

G. Monitor and water sod to achieve optimum sod establishment for a period of 90 days or until well established, whichever is longer. Generally, sod should receive 5 gallons per square yard every two days.

H. It is recommended that sodded areas not be used until sod has established, a period usually 2-3 weeks. To keep foot traffic off newly sodded areas, controls will need to be coordinated with the Owner. Contractor may erect temporary controls such as construction ribbon attached to stakes.

3.4 TURF MAINTENANCE

A. Maintain sodded areas for a minimum of 90 days from final project approval.

1. Watering

a. Set irrigation system to provide optimal water rates.
b. Water sod as needed to achieve optimum establishment and growth. Water to achieve a recommended rate of 5 gallons per square yard every 2 days until established. Rainfall may relieve the need for watering at certain times.
c. Water in a manner to achieve infiltration of water and avoid run-off and soil erosion.
d. Supplemental watering with hoses, portable sprinkling devices and other equipment will be necessary in the open area east of the parking lot for successful turf establishment.

2. Mowing

a. Mow sodded areas including edges around the sidewalks.
b. Mow with reel-type or rotary-type mowers, edgers, etc. with sharp blades set level. Mowed areas shall be smooth and uniform in height.
c Mow when the grass is relatively dry and ground is firm.
d. Mow when growth reaches a height of 5 inches. Cut to a height of 3 inches. If Contractor delays result in excess turf growth prior to mowing, Contractor must also rake and remove cuttings from the site.

3. Post-sod Fertilizing

a. Thirty (30) days following the first mowing, re-fertilize turf areas at the rate of 200 lbs. per acre of actual nutrient using post-seed fertilizer.

4. Weeding

a. Keep areas free of weed growth.

5. Treatments

a. Treat turf for insects, disease, fungus, or other adverse conditions that develop. Discuss conditions with Landscape Architect and agree to an appropriate treatment. Provide treatment following good horticultural practices and product manufacturer's guidelines.

6. Replacement

a. Immediately replace dead or dying sod. Sod replaced during installation period prior to project approval is not considered part of the warranty replacements. After installation approval, any sod replacement will be covered under the sod warranty.

3.5 CLEAN-UP

A. Leave site clean and free of debris. Repair any damage to existing features to the satisfaction of the Owner's Representative.

END OF SECTION

SECTION 32 93 00 – PLANTS

PART 1 – GENERAL

1.1 WORK INCLUDES

A. Base Bid

1. General Contractor provide and install

a. Plant Material

1) Trees and Shrubs
2) Flowers and Groundcovers

b. Associated Materials

2. Maintenance
3. Warranty

1.2 RELATED WORK

A. Specified elsewhere

1. All related exterior improvement work

1.3 QUALITY ASSURANCE

A. All work described in this Section is to be done by a firm specializing in such work with documented 5 years minimum experience in plant material installation. The personnel of the firm are to be experienced in the work specified and work under the direction of a foreman with 3 years minimum experience.

B. Contractor personnel engaged in herbicide application to have an Illinois Applicator's License.

C. Tree trimming to be done by a certified arborist.

1.4 SUBMITTALS

A. Contractor provide

1. Prior to commencing work

a. Sources and photographs of proposed plant material. Trees noted on the plans are to be selected by the Landscape Architect in the nursery.
b. One-half cubic foot sample each of fine-textured and medium-textured hardwood mulch.

2. Upon completion of work

a. Tags from fertilizer and soil amendments used in the project.

1.5 PROTECTION

A. Contractor is responsible to protect and avoid all existing above ground and underground utilities during construction operations. Repair of any utilities damaged by installation is the responsibility of the Contractor.

B. Contractor is responsible to protect all existing conditions including structures, pavements, and plant material from damage during project installation and maintenance. Any damages occurring are the responsibility of the Contractor to replace, repair or compensate the Owner for damages.

1.6 WARRANTY

A. Contractor shall warranty all material and work in this project for one complete year, starting after final project acceptance. Any plant replacements prior to project acceptance are not considered warranty replacements. Contractor will provide one replacement of each plant, if necessary, in accordance with these plans and specifications. During this time if a plant dies, becomes diseased or unsightly, the Owner's Representative may request immediate or future replacement and the Contractor shall promptly comply.

1.7 REFERENCES

A. U.S.D.A. Standards for Nursery Stock, American Association of Nurserymen.

B. Standardized Plant Names, American Joint Committee on Horticulture Nomenclature.

C. National Arborists Association Pruning Standards.

PART 2 – PRODUCTS

2.1 PRODUCTS AND MATERIALS

A. All Plant Material

1. Approved by the Owner's Representative prior to installation.
2. Specimen quality.
3. Species and sizes specified.
4. Growth habit representative of species.
5. Free from diseases, insect pests and injuries.
6. Clearly marked as to source, species and variety.

B. Balled and Burlapped (B&B) Plants

1. Grown in a nursery with climatic conditions similar those at the project site.
2. Have a single leader unless otherwise specified.
3. Have been pruned frequently while growing in the nursery to avoid forked leaders, low or uneven branching, asymmetric growth, crossed limbs and scars from pruning.
4. Dug only when plants are dormant.
5. Dug in accordance with best nursery practices.

6. Have solid earthen balls that encompass the fibrous and feeding roots of the plant in accordance with industry standards for species and caliper size.

C. Container Grown Plants

1. Grown in pots of specified size with high quality rooting medium within 1 inch of the top of the container.
2. Well grown-in with roots that fully encompass the rooting medium.
3. Tops that are full and healthy at the time of planting.

D. Topsoil

1. Loamy soil from the A horizon soil profile of local prairie-type soils.
2. Imported to the site if on-site topsoil not available and meet the above criteria.
3. Organic content between 8 and 10 percent.
4. Free from roots, sticks, weeds, stones, etc. larger than 1 inch in dimension.
5. Free of foreign material including construction waste, litter and contaminating products.
6. At least 90 percent must pass the 2.00 mm sieve.
7. pH between 6.0 and 8.0.

E. Fine-Textured Wood Mulch: Composted, shredded hardwood of particles no larger than 2" in any dimension and free of all foreign materials.

F. Medium-Textured Wood Mulch: Composted, shredded hardwood of particles no larger than 4" in any dimension and free of all foreign materials.

G. Peat Moss: Natural sphagnum peat moss that is an organic soil conditioner which regulates moisture and air around plant roots for ideal growing conditions.

H. Manure: Natural, organic agricultural compost that is commercially available.

I. Fertilizer: Slow release granular form containing 14% nitrogen, 14% phosphoric acid and 14% potash.

J. Herbicide: Non-specific glyphosate weed killer such as Round-up brand.

K. Pre-emergent herbicide: Slow-release granular type specifically recommended for use in new planting areas.

L. Water is available at the site from the irrigation system. Contractor to provide all necessary labor and equipment including hoses and watering apparatus to water according to these specifications.

M. Staking materials

1. Hardwood stake 2” x 2” x 3’ feet long.
2. Wire, 6 gauge.
3. Tree protector, reinforced vinyl hose.

2.2 DELIVERY, STORAGE AND HANDLING

A. Deliver plant material to the site within 48 hours of installation.

B. Transport and handle plant material to avoid physical damage and desiccation. Use protective covering during shipment.

C. Keep plants in the shade, roots moist, and protect from weather and mechanical damage.

D. During installation, handle plants to avoid damage. Should any plant parts be damaged during operations, the Owner's Representative will decide if immediate replacement is required.

E. Store fertilizer above ground and covered with polyethylene to minimize moisture absorption.

PART 3 – EXECUTION

3.1 PLANTING

A. Time of Operations

1. Plant when the climatic and soil conditions are appropriate as confirmed by the Project Manager.

2. Install plant material

a. When the ground is not frozen and soil is friable.
b. When soil moisture is adequate as confirmed by the Owner's Representative. Dry, powdery soils or wet, muddy soils will not be accepted.

B. Site Preparation

1. Locate utilities and any other underground improvements.
2. Provide safeguards as needed to protect structures, pavement and plant material from possible damage during construction.
3. Flag the location of each tree and the perimeter of shrub and planting beds. Notify Owner's Representative to review flagging and make adjustments as needed before digging operations begin.

C. Planting

1. Trees and Shrubs

a. Preparation

1) Remove and dispose of all existing vegetation over areas to be planted and mulched.
2) Remove any debris from topsoil in the area to be planted and mulched. Soil to be firm, stable, and at finish grade (see Section 31 2219 – Finish Grading).

b. Excavations

1) Excavate plant pits with near vertical sides and flat bottoms. Scarify side walls to allow soil bonding. No smooth or glazed excavated side or bottom surfaces will be allowed.
2) Excavate to the dimensions shown on plans.
3) Dispose of extra excavated soil on-site as directed by Owner's Representative.
4) Leave no excavations open overnight.
5) If beds or pits do not adequately percolate as determined by the Project Manager, auger hole below the excavation to a depth determined necessary and backfill with pea gravel as shown on plans and described in Finish Grading Section – 31 2219.

c. Setting Plants

1) Set plants in excavations to the level that will result in the elevation at which the plants were grown (after any soil settlement). Fill to be deposited in 12" lifts and firmly tamped to prevent future settlement.
2) Open and pull burlap of B&B plants back from top of ball and tuck around the sides of the ball.
3) Backfill with topsoil in lifts of 6 inches around root balls and firmly hand tamp.
4) Place fertilizer uniformly in the backfill.

a) For each ½" of plant diameter use 10 grams of actual fertilizer nutrients.
b) For every gallon of container material use 5 grams of actual fertilizer nutrients.

d. Saucers of Soil

1) Form saucers around individual plants and groups of plants as shown on plans.

e. Watering

1) Water plants thoroughly within 2 hours of installation.
2) Continue watering and other maintenance as described below.

f. Pre-emergent Herbicide

1) Treat soil with pre-emergent herbicide according to product recommendations prior to mulch placement.

g. Mulch

1) Trees, shrubs, shrub masses and hedges

a) Place medium textured hardwood mulch as shown on plans.

b) Hold mulch back 3-4" from tree trunks.

h. Plant Support

1) Tree staking is not required at the time of planting.
2) If trees begin leaning for any reason, Contractor shall right and immediately stake those trees according to project drawings.

2. Flower and Groundcover Beds

a. Planting Preparation

1) Remove and dispose of all turf or other vegetation over areas to be planted and mulched.
2) Remove any debris from topsoil in the area to be planted and mulched. Soil to be firm, stable and at finish grade (see Section 31 2219 – Finish Grading).

b. Excavations

1) Excavate planting beds with near vertical sides and flat bottoms.
2) Excavate to the dimensions shown on plans.
3) Dispose of extra excavated soil as directed by Owner's Representative.
4) Leave no excavations open overnight.
5) If beds do not adequately percolate as determined by the Landscape Architect, auger hole below the excavation to a depth determined necessary and backfill with pea gravel as shown on plans and described in Finish Grading Section – 31 2219.
6) Place topsoil according to project plans.
7) Till beds to a depth of 6 inches forming particles no greater than 1inch.
8) Cover beds with a 2 inch depth of peat moss and a 2 inch depth of manure, and till again to a depth of 8 inches to thoroughly mix the materials.

c. Setting Plants

1) Set plants in excavations at the same level at which they were grown.

d. Watering

1) Thoroughly water plants within 2 hours of installation.
2) Continue watering and other maintenance as described below.

e. Pre-emergent Herbicide

1) Treat beds with pre-emergent herbicide according to product recommendations prior to placement of mulch.

f. Mulch

1) Mulch with fine textured hardwood mulch as shown on the plans.

D. Plant Maintenance

1. Maintain plant material for a minimum 60 days after installation or until final project approval, whichever is longer.

2. Weekly monitoring and maintenance. Contractor shall carefully evaluate the site on a regular weekly basis and provide any/all of the following as needed.

a. Watering

1) Water plants as needed to achieve optimum establishment and growth.
2) Recommended watering rates: 10 gallons for each tree every 4 days, 5 gallons for each shrub every 4 days, and 5 gallons per square yard of flower beds every 2 days. Rainfall may relieve the Contractor of watering at certain times. Monitor conditions and resume watering when needed. Water in a manner to achieve infiltration of water and avoid run-off.
3) Provide hoses, portable sprinkling devices and other equipment needed for successful watering.
4) Water is available at quick coupling valves within park plaza.

b. Weeding

1) Keep mulched areas free of weed growth.

c. Mulch replenishment

1) If mulch is displaced due to rainfall or other natural or manmade occurrences, the Contractor is responsible to rake or reposition mulch to original position.
2) Add additional mulch as necessary to maintain depth as specified.

d. Replacement

1) Immediately replace dead or dying plants. Plants replaced during the establishment period are not warranty replacements.

3.2 CLEAN-UP

A. Leave site clean and free of debris. Repair any damage to the satisfaction of the Owner's Representative.

END OF SECTION

SECTION 32 9800 – SITE SIGNS

PART 1 – GENERAL

1.1 WORK INCLUDES

A. Base Bid

1. General Contractor provide and install

   a. Aluminum sign panels
   b. Attachment brackets and miscellaneous hardware

2. Warranty

1.2 RELATED WORK

A. Specified elsewhere

1. All related exterior improvement work.

1.3 QUALITY ASSURANCE

A. All work described in this Section is to be done by a firm specializing in such work with documented 5 years experience in similar work. The personnel of the firm shall be experienced in the work specified and shall work under the direction of a skilled foreman.

1.4 SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: panel signs.

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supports and accessories.
3. Show message list, typestyles, graphic elements, and layout for each sign at least ¼” = 1’-0”

C. Samples: For each exposed product and for each color and texture specified.

D. Sign Schedule: Use same designations specified on Drawings.

1.5 DELIVERY

A. Arrange for deliveries of products in accord with approved current construction schedules and in ample time for inspection prior to installation.

1.6 STORAGE

A. Contractor provide and maintain

1. Storage for materials and equipment to be installed in Project.
2. Protection and security for stored materials and equipment on and off site.

1.7 PROTECTION

A. Contractor is responsible to protect and avoid all existing above ground and underground utilities during construction operations. Repair of any utilities damaged by construction is the responsibility of the Contractor.

B. Contractor is responsible to protect all existing conditions including structures, pavement and plant material from damage during construction. Any damages occurring is the responsibility of the Contractor to replace, repair or compensate Owner for damages.

1.8 FIELD CONDITIONS

A. Existing Signs & Mockup

1. Field verify existing signs at the City's 125 South Seminary Street parking lot for design intent, materials, and quality.

1.9 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Deterioration of finishes beyond normal weathering.
b. Deterioration of embedded graphic image.
c. Separation or delamination of sheet materials and components.

2. Warranty Period

a. Five (5) years from date of Substantial Completion.

1.10 REFERENCE

A. Illinois Department of Transportation Standard Specification for Roads and Bridge Construction adopted April 1, 2016, as amended referred to herein as IDOT Standard Specifications.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structure and Anchorage: Engineering for structural integrity and safe permanent installation shall be the sole responsibility of the fabricator/installer and must withstand design loads required by the 2009 International Building Code for this region.

B. Thermal Movements: For exterior signs, allow for thermal movements from ambient and surface

temperature changes.

1. Temperature Change: 120 deg F (67 deg C), ambient; material surfaces.

C. Accessibility Standard: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for signs.

2.2 PANEL SIGNS

A. Panel Sign

1. According to Section 1090 – Sign Base and Section 1091 – Sign Face, Sign Base, and Supplemental Panels, IDOT Standard Specifications.

2. Sign panels to have smooth, uniform surfaces and support assembly; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles.

3. Sign Panels

1) Type 2 sign panels for surfaces less than 24 square feet

a) 0.125 inches thick flat sheet aluminum according to Section 1090.02, black color back and sides
b) Front sign colors to match 125 S. Seminary Street parking lot sign and project plans.

4. Letters and symbols

1) Type AP sheeting according to the Fabrication of Highway Signs Policy dated February 1, 2016 and Section 1091.03, IDOT Standard Specifications.
2) High intensity cube-cornered prismatic sheeting
3) UV, scratch, impact and graffiti resistant
4) Letter forms and symbols shall be photographically precise, crisp, clean and free of ticks, discontinuous curves, free of line waves, cut or ragged edges, edge build-up, bleeding surface pinholes, and other imperfections
5) Lettering styles to match approved shop drawings and those shown on project plans.
6) Letter forms shall conform to the prescribed letter form proportions

5. Fasteners and Anchors

a. Manufacturer's standard as required for secure anchorage of signage, noncorrosive and compatible with each material joined, and complying with the following:

1) Fasteners: Corrosion resistant and tamper resistant, and as detailed and noted on the plans.
2) Use concealed fasteners and anchors unless indicated to be exposed
3) Bolts, nuts, and other hardware according to Section 1090.03.
4) Black color

6. Performance Requirements

   a. Fabrication and installation shall be according to the project plans so as to withstand design loads required by ASCE 7-10 for this region.
   b. Thermal Movements: For exterior signs, allow for thermal movements from ambient and surface temperature changes
   c. Temperature Change: 120 deg F (67 deg C), ambient; material surfaces
   d. Accessibility Standard: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for signs

PART 3 – EXECUTION

3.1 SIGN INSTALLATION

A. General: Install signs using installation methods indicated and according to manufacturer's written instructions and Section 720 – Sign Panels and Appurtenances, IDOT Standard Specifications.

   1. Install signs, level, plumb, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
   2. Install signs so they do not protrude or obstruct according to accessibility standards.
   3. Verify that sign components are clean and free of materials or debris that would impair installation.
   4. Install signs on light poles with approved fasteners. Two signs per pole, back-to-back as detailed on project plans.
   5. Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

3.2 CLEAN-UP

A. Thoroughly clean signs and light poles of all effects of construction.

B. Leave site clean and free of debris. Repair any damage to existing features to the satisfaction of the Owner's Representative.

END OF SECTION

SECTION 33 4616 – SUBDRAINAGE PIPING

PART 1 – GENERAL

1.1 WORK INCLUDES

A. Base Bid

1. General Contractor provide and install

a. Drain tile in gravel border
b. Drain system in plaza lawn
c. Drain tile clean-outs

2. Warranty

1.2 RELATED WORK

A. Specified elsewhere

1. All related exterior improvement work.

1.3 QUALITY ASSURANCE

A. All work described in this Section is to be done by a firm specializing in such work with documented 5 years experience construction of similar structures. The personnel of the firm shall be experienced in the work specified and shall work under the direction of a skilled foreman.

1.4 SUBMITTALS

A. Product Data

1. Contractor to submit for approval

a. Information and cut sheets for all products

1.5 PROTECTION

A. Contractor is responsible to protect and avoid all existing underground and above ground utilities during construction operations. Repair of any utilities damaged by installation is the responsibility of the Contractor.

B. Contractor is responsible to protect all existing conditions including structures, pavements, and plant material from damage during project installation and maintenance. Any damages occurring are the responsibility of the Contractor to replace, repair or compensate Owner for damages.

1.6 WARRANTY

A. Contractor to warranty materials and work for a period of one year.

1.7 REFERENCE

A. Illinois Department of Transportation Standard Specification for Roads and Bridge Construction adopted April 1, 2016, as amended referred herein as IDOT Standard Specifications.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Perforated Drain Tile: 4" High Density Polyethylene (HDPE) with fabric sock from a manufacturer who is fully experienced, reputable, and qualified in the manufacturer of HDPE pipe.

1. Drain tile and accessories manufactured by Advanced Drainage Systems, Inc., 3130 Verona Avenue, Buford, Georgia 30518, 866-888-8479, www.ads-pipe.com or approved equal.

B. Clean-out

1. PVC riser and pipe: 4" PVC pipe Schedule 200 meeting the requirements of Section 1040, Drain Pipe, Tile, Drainage Mat, and Wall Drain, IDOT Standard Specifications.
2. Clean-out: 4" diameter low profile drain with 4" diameter open grate as manufactured by Advanced Drainage Systems, Inc., 3130 Verona Avenue, Buford, Georgia 30518, 866-888-8479, www.ads-pipe.com or approved equal.
3. Component pipe fittings and elbow connections: Products manufactured by Advanced Drainage Systems, Inc., 3130 Verona Avenue, Buford, Georgia 30518, 866-888-8479, www.ads-pipe.com or approved equal.

C. Pea Gravel: ½" diameter, clean pea gravel.

D. Geotextile Fabric

1. Needlepunched nonwoven geotextile composed of polypropylene fibers in accordance with Section 1080 Fabric Materials, IDOT Standard Specifications.
2. Mirafi 140NL as manufactured by TenCate Geosynthetics Americas, 365 South Holland Drive Pendergrass, Georgia 30567, (p) 706-693-2226 or approved equal.

E. Aggregate: CA-6 and CA-7 grade limestone aggregates meeting Section 1004.01 Coarse Aggregate, IDOT Standard Specifications.

PART 3 – EXECUTION

3.1 Installation

A. Drain tile in Gravel Border

1. Excavation

    a. Cleanly excavate trenches to near-tile elevations.

2. Installation

    a. Place geotextile fabric along bottom of trench and up sides.
    b. Place continuous lines of drain tile in trenches at slopes shown on plans.
    c. Connect tile sections with fittings secured with adhesive.

3. Backfill

    a. Backfilled trench with river gravel taking care not to dislocate tile.
    b. Rake gravel to achieve a smooth, uniform surface.

B. Drain System in Plaza Lawn

1. Excavate

    a. Cleanly excavate plaza lawn area 20” below finished grade and compact to achieve uniform surface.

2. Installation

    a. Place geotextile fabric along bottom of excavated areas and up sides.
    b. Install perforated drain tiles in locations shown on project plans.
    c. Backfill with pea gravel to a 4” depth, covering top of the drain tile.
    d. Place geotextile fabric on top of pea gravel layer.

3. Backfill

    1. Deposit Plaza Lawn topsoil mix (75% topsoil, 25% sand) over fabric wrapped pea gravel layer to a depth of 16”.
    2. Spread with light weight, lawn-scale equipment to avoid excess compaction.
    3. Spread topsoil along sidewalks and other improvements with hand tools to avoid damage to the improvements.
    4. Soil clods to be no greater than 1” in any dimension.
    5. Finish grade according to Section 31 2219 – Finish Grading.

C. Drain Tile Clean-out

1. Excavation

    a. Excavate to the bottom of the pipe connection at the clean-out locations.

2. Installation

    a. Compact bottom of excavated area to 95% density.
    b. Place pipe connections at the base of the excavated area to elevations shown on

the project plans.

c. Secure elbow connection and clean-out to drain tile according to manufacturer's instructions.

d. Secure grate to clean-out flush with finished grade.

3. Backfill

a. Backfill with approved soil or river gravel, compacting in lifts to 92% density.

3.2 CLEAN-UP

A. Leave site clean and free of debris. Repair any damage to the satisfaction of the Owner's Representative.

END OF SECTION