OUTLINE SPECIFICATIONS
APRIL 22, 2024

West End Compost Hub
37 Westfield Street
Providence, RI 02907

SITE OWNER
West Elmwood Housing Development Corp.
224 Dexter Street
Providence, RI 02907

SITE MANAGER
Groundwork Rhode Island
1005 Main Street, No. 1223
Pawtucket, RI 02860

DESIGN ARCHITECT
Rhode Island School of Design
Research Team
231 South Main Street
Providence, RI 02903

ARCHITECT OF RECORD
BriggsKnowles A+D
44 East Street
Providence, RI 02906

STRUCTURAL ENGINEER
Northeast Engineers & Consultants, Inc
6 Valley Road
Middleton, RI 02818

CIVIL ENGINEER
Diprete Engineering
Boston/ Providence/ Newport
Two Stafford Court
Cranston, RI 02920

OUTLINE SPECIFICATIONS
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SUMMARY

PART 1 GENERAL

1.1 SUMMARY

A. Project Identification: West End Compost Hub

B. Site Owner: West Elmwood Housing Development Corp. (401) 453-3220
Site Manager, leasing the property from the owner: Groundwork RI (401) 305-7174

C. Primary Contact: Ella Kilpatrick Kotner, Harvest Cycle Program Coordinator. (808) 987-6662, ekotner@groundworkri.org

D. Project Summary: The West End Compost Hub is being created to divert organic waste away from the Johnston Central Landfill – which is nearly at capacity – and produce a high-quality soil amendment to improve soils and bolster urban food production in Providence. The project includes an in-vessel aerobic composter, leaf storage, and equipment sheds. The buildings are set back from the street and framed by a set of gardens and muraled fences to enhance the street life. The buildings are built out of robust concrete walls up to 5' and then topped with translucent polycarbonate walls and roofs. A solar canopy is designed to provide for all site energy. The hub will serve as an educational facility and provide both ecosystem and economic benefits to the neighborhood while challenging the industrial aesthetic often associated with waste processing facilities.

E. Particular Project Requirements:
1. Pre-purchased and pre-ordered items: Site Built Earth Flow Compost Auger by Green Mountain Technologies (GMT). See attached specification sheet.
2. Owner-purchased, Contractor-installed items: Site Built Earth Flow Compost Auger by Green Mountain Technologies (GMT). See attached specification sheet.

F. Permits and Fees: Apply for, obtain, and pay for permits, fees, and utility company back charges required to perform the work. Submit copies to Architect.

G. Codes: Comply with applicable codes and regulations of authorities having jurisdiction. Submit copies of inspection reports, notices and similar communications to Architect.

H. Dimensions: Verify dimensions indicated on drawings with field dimensions before fabrication or ordering of materials. Do not scale drawings.

I. Existing Conditions: Notify Architect of existing conditions differing from those indicated on the drawings. Do not remove or alter structural components without prior written approval.

J. Coordination:
1. Coordinate the work of all trades.
2. Prepare coordination drawings for areas above ceilings where close tolerances are required between building elements and mechanical and electrical work.
3. Verify location of utilities and existing conditions.

K. Installation Requirements, General:
1. Inspect substrates and report unsatisfactory conditions in writing.
2. Do not proceed until unsatisfactory conditions have been corrected.
3. Take field measurements prior to fabrication where practical. Form to required shapes and sizes with true edges, lines and angles. Provide inserts and templates as needed for work of other trades.

4. Install materials in exact accordance with manufacturer's instructions and approved submittals.
5. Install materials in proper relation with adjacent construction and with proper appearance.
6. Restore units damaged during installation. Replace units which cannot be restored at no additional expense to the Owner.
7. Refer to additional installation requirements and tolerances specified under individual specification sections.

L. Limit of Use: Limit use of work as indicated. Keep driveways and entrances clear.

M. Definitions:
1. Provide: Furnish and install, complete with all necessary accessories, ready for intended use. Pay for all related costs.
2. Approved: Acceptance of item submitted for approval. Not a limitation or release for compliance with the Contract Documents or regulatory requirements. Refer to limitations of 'Approved' in General and Supplementary Conditions.
3. Match Existing: Match existing as acceptable to the Owner.

N. Intent: Drawings and specifications are intended to provide the basis for proper completion of the work suitable for the intended use of the Owner. Anything not expressly set forth but which is reasonable implied or necessary for proper performance of the project shall be included.

O. Writing Style: Specifications are written in the imperative mode. Except where specifically intended otherwise, the subject of all imperative statements is the Contractor. For example, 'Provide tile' means 'Contractor shall provide tile.'

PART 2 PRODUCTS - Not Applicable To This Section

PART 3 EXECUTION - Not Applicable To This Section

END OF SECTION

GENERAL SPECIFICATIONS

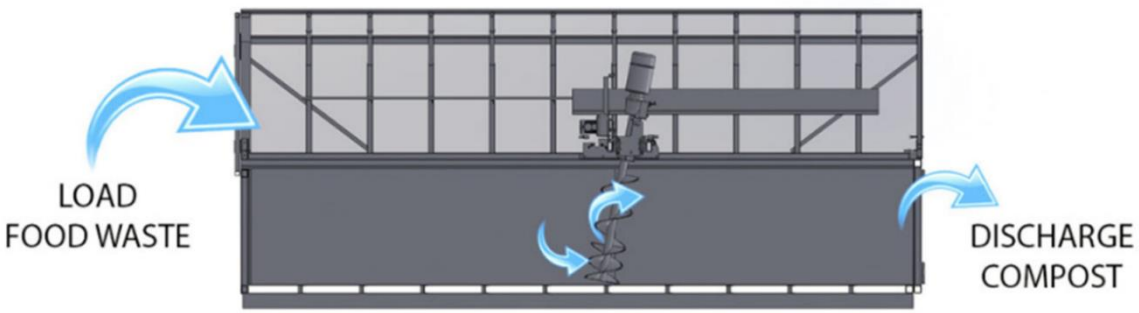
The Site Built Earth Flow is constructed from local sourced materials, significantly lowering the cost of construction and simplifying transportation. The vessel is built to the following specifications and can process the following quantities:

General Specifications	
Vessel Length	50.0 feet (21.4 meters)
Vessel Internal Width	11.5 feet (3.5 meters)
Vessel Wall Height	4.66 feet (1.4 meters)
Vessel Material	Poured Concrete
Mixing System Material	304 Stainless Steel
Electrical consumption	20 to 24 kwh per day

Capacity Specifications	
Volume	76 yd^3 (58 m^3)
10-day retention	3.7 ton/day
14-day retention	2.9 ton/day
21-day retention	2.1 ton/day

For those composting inert materials such as bedded manure or green waste, retention times of 7 to 14 days are adequate. For those composting energetic or putrescible materials such as food waste, retention times of 14 to 21 days are recommended. Most feedstocks will require 2 to 8 weeks of curing once removed from the vessel. Site built systems longer than 40’ must be operated on a batch system if you would like retention times less than 21 days.

All compost mixes entering the Earth Flow must have a particle size of 6-inch minus, a combined bulk density less than 900 lbs. per cubic yard, a C:N ratio in the range of 20:1 to 40:1, and a starting moisture content of about 60%. Failure to meet these criteria may damage the vessel and/or reduce composting efficacy. The Earth Flow can handle almost all organic matter that meets these criteria including small animal mortalities, compostable plastics, and fats/meats.



THE VESSEL

GMT Responsibilities

- Provide dimensions and suggested construction techniques for the site built vessel
- Install the mixing system into the vessel
- Provide and install carriage rails

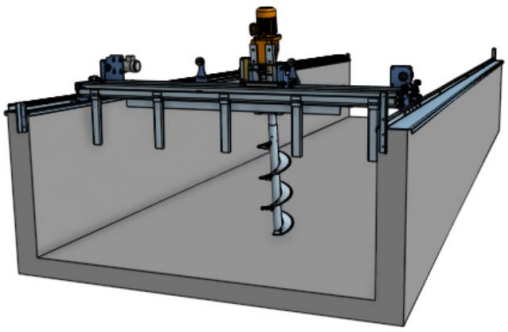
Client Responsibilities

- All site work including grading, pouring foundations, constructing biofilter/aeration system, pouring concrete walls, installing roof structures and running utilities
- Any stamping requirements or permits

The Site Built Earth Flow is constructed from poured concrete to dimensions stipulated by GMT. It is essential that the customer constructs the vessel to the dimensions and tolerances stipulated by GMT. Failure to meet GMT's specs may result in the mixing system not integrating correctly into the vessel adversely affecting operations. Leachate is entrapped within the below grade aeration system (if purchased) or sheet drains to a collection point on the load end of the vessel. GMT highly recommends covering the Site Built Earth Flow to enhance odor and leachate control.

The vessel should meet the following criteria.

- Wall length: 50 feet min
- Suggested wall length: 50 feet
- Wall internal width: 11 feet 6 inches
- Wall internal width tolerance: ± 1/4 inches
- Wall external width: 12 feet 2 inches min
- Wall height: 4 feet 8 inches
- Wall height tolerance: ± 1/8 inch
    - Top of wall must be smooth.
- Wall material: Poured Concrete or Ecoblocks
- Vessel floor material: Poured concrete or asphalt.
- Suggested vessel grade 1.5% towards load end
- Subgrade & fill: Compacted, free draining and completely settled.
- Custom Stainless Z-bend: 11 GA, 10" x 60' and 14" x 50' (2" and 2-3/8" stems)



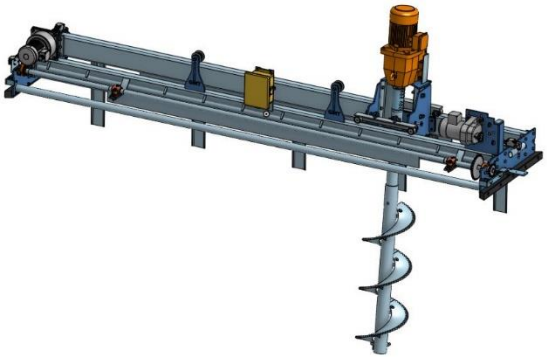
Warning! Make sure you can lock earth flow behind doors so that people or animals cannot wander in. Failure to comply may result in injury or death.

THE MIXING SYSTEM

The mixing system is the principal mechanical system for the Earth Flow both agitating, shredding, and moving compost inside the vessel. The mixing system is comprised of three separate sub-assemblies, the carriage, travel car and auger assembly. These systems are driven by robust drive chains and reliable brother motors. The angle of the auger can be adjusted to control retention time within the vessel. All components will be installed in the vessel and tested prior to shipment.

The mixing system is comprised of the following components:

- 304 stainless steel welded assembly
- Two Fractional hp brother drive motors and gearboxes
- One 7.5 hp Nord auger motor and gearbox
- Drive chain and sprockets
- UHMW plastic slides
- Stainless steel fasteners and hardware
- Three sections of auger flighting
- A 3'' auger drive and stub shaft
- A 3'' pillow block bearing



Make sure to replace the auger flighting before the teeth have worn off. Failure to comply may damage the mixing system and or reduce the composting efficacy.

Warning! No one is allowed to enter the vessel or be within five feet of the mixing system while it is operating. Make sure to keep hair, fingers and limbs away from the auger, chain drives, sprockets and sliders at all times. Failure to comply may result in serious injury or death.

THE CONTROL SYSTEM

GMT Responsibilities

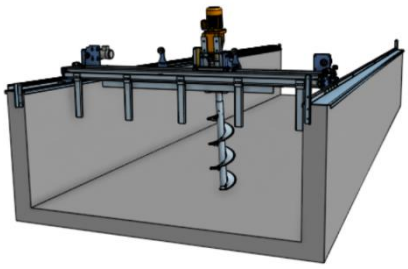
- Provide a detailed wiring schematic
- Terminate all low voltage wiring

Client Responsibilities

- Run all high voltage wire and conduit and provide a distribution box, distribution panel, and breaker
- Terminate all high voltage connections
- Hang all panels on the right side of the load end of the vessel

The Earth Flow is powered by GMT's rugged industrial control system which is tested at length in our UL certified shop prior to shipment. Motors are US standard 60 hz 460V three phase power. Controls and require 15A 110V services. GMT assumes all panels will be hung on the right side of the container when facing the earth flow from the load end. Power and panel location may be adjusted for an additional fee.

The control system comes with the following components:



Main Control Panel

- NEMA 4X enclosure 20" H x 17.5" W x 9" D
- Crouzet PLC Controller - 24V Input
- PULS Power Supply - AC 100-240V 50-60Hz Input - 24V 1.3A 30W Rating, Single Phase
- Key switch for power up security an emergency stop switch for safety
- Panel assembly UL Certified

Positional Motor's VFDs

- 380-460V Three Phase Electrical Service
    - (2) Non-Switched, Constant Torque, Sensorless Vector, Variable Frequency Drives – 1 HP 0.75 kW Rating
    - 1.4A FLA (both motors), 50-60Hz

Auger Motor VFD

- (1) Non Switched, Constant Torque, Sensorless Vector Invertek 7.5 HP, 5.5kW
- AC Input: 380-460VAC, 9.75A FLA, 50-60Hz

Cable Chain Wiring Harness

- Igus Energy Chain - Dust Proof - Heat Treated Plastic - Non-Openable - Mounting Brackets Included – Preassembled with SOW electrical cables for motor drives and limit switch signal
- (4) Plunger Limit Switches

Carriage J-box

- NEMA 4X FRP Enclosure 10" H x 7.5" W x 5" D
- NEMA 4X Cord Grips Terminal blocks for Limit Switch Termination to SOOW cable

UTILITITES AND SITE PREP

GMT Responsibilities

- 5 remote client meetings to clarify operations and site prep work.
- 16 hours of remote consultation to assist with vessel design and configuration
- Detailed wiring schematics
- A ¾" female standard garden hose fitting for addition moisture system (if purchased)
- Install and test the moisture addition system

Client Responsibilities

- Get power and water to the site.
- Pour and construct the "vessel"
- Ensure that there is roadway access to the installation location and provide/operate a forklift during installation
- Purchase and install a ¾" standard male garden hose fitting with water hookup close to the location of the control panels.
- Any stamping or permit requirements associated with the project

The Earth Flow requires standard US standard 60 hz three phase power. Power and water must be brought to the right-hand side of the vessel as viewed from the load end (see image for reference). Please contact GMT as soon as possible if this is an issue.

The surface should slope towards the load end of the vessel at a grade of 1% to 2%. This keeps all leachate draining towards fresh feedstocks, mitigating pathogen transmission. It is important that you have roughly 20' of space on either side of the vessel for loading and unloading the composter. In most applications two small bunkers will also be required for curing the material and storing finished products.

SECTION 00 21 00
INSTRUCTIONS TO BIDDERS

1. Project Name and Location:

   West End Compost Hub
   37 Westfield Street
   Providence, RI 02907

2. Project Summary: The West End Compost Hub is being created to divert organic waste away from the Johnston Central Landfill – which is nearly at capacity – and produce a high-quality soil amendment to improve soils and bolster urban food production in Providence. The project includes an in-vessel aerobic composter, leaf storage, and equipment sheds. The buildings are set back from the street and framed by a set of gardens and muraled fences to enhance the street life. The buildings are built out of robust concrete block walls up to 5' and then topped with translucent polycarbonate walls and roofs. A solar canopy is designed to provide for all site energy. The hub will serve as an educational facility and provide both ecosystem and economic benefits to the neighborhood while challenging the industrial aesthetic often associated with waste processing facilities. Please note that there is lead and PAH-impacted soil at the site that must remain onsite during construction and will be capped in accordance with the design plans. The general contractor and all sub-contractors will need to keep soil in the general area that it came from during construction in order to avoid the need for recharacterizing soil if any extra soil is generated for disposal. Contractors will need to ensure soil is not tracked offsite and that erosion and dust controls are in place.

3. Bidding Documents: This document contains instructions to bidders for the project named above. This bidding document is not part of the Contract Documents, unless specifically referenced in the Owner/Contractor Agreement. **To obtain an emailed PDF file of the bidding documents contact:**

   Ella Kilpatrick Kotner
   Harvest Cycle Coordinator
   Groundwork Rhode Island
   1005 Main Street, Suite 1223
   Pawtucket, RI 02860
   p) 401 305-7174
   e) ekotner@groundworkri.org

4. Deposit for Printed Documents: A deposit in the amount of $200.00 is required If any bidder would like to obtain a printed copy of the bid documents. Make checks payable to Groundwork Rhode Island. Deposits will be returned in full if the bidding documents are returned complete and in usable conditions within 7 calendar days after bid due date. Contact the person named above to obtain a copy.

5. Submission of Bids: Submit Bid Form before the time and date below. Late submissions will not be considered. Submit bids in sealed and labeled envelopes with the project name and bidder's name on the outside of the envelope. Mark the envelope: 'Bid Enclosed - Do Not Open'.

6. Submit Bid To:
   Ella Kilpatrick Kotner
   Groundwork Rhode Island
   1005 Main Street, Suite 1223
   Pawtucket, RI 02860
   p) (401) 305-7174
   e) ekotner@groundworkri.org

7. Date and Time of Day of Submission: Monday, May 20, 2024 @ 5:00 PM.

8. Bid Opening: Bids will be opened in private. Bidders may not be present. Bids may not be withdrawn for 30 calendar days after receipt of bids. Announcements of bid results will be made within 15 days after receipt of bids. A bid security is not required.

9. Bonds: A Performance and Payment Bond is required. Each bidder shall submit evidence of bondability for the entire value of the work. Bonds must be executed by a surety company licensed to do business in Providence, RI. Use bond form AIA Document A312.

10. Modifications: Oral, fax or email modifications to bids will not be considered.

11. Modifications: The Owner reserves the right to modify the Contract Documents and rebid the project, if necessary, to meet Owner's budgetary requirements.

12. Questions: During the bidding period, submit questions to the person named below. Questions will be answered in writing and copies distributed to bidders of record.

    Ella Kilpatrick Kotner
    Harvest Cycle Coordinator
    Groundwork Rhode Island
    1005 Main Street, Suite 1223
    Pawtucket, RI 02860
    p) (401) 305-7174
    e) ekotner@groundworkri.org

13. Site Visit: A site visit is required. Contact the person named above to arrange a visit.

14. Liability Insurance – Successful Bidder must agree to procure and maintain at its expense, Commercial General Liability insurance for protection from claims under workers' compensation acts, claims for damages because of bodily injury including personal injury, sickness or disease or death of any and all employees or of any other such employees, and from claims for damages because of injury to or destruction of property including loss of use resulting therefrom, which may arise from the performance of services hereunder. The minimum amounts of coverage are:

Type of Insurance	Each Occurrence	Aggregate
General Liability – Combined Bodily Injury and Property Damage	$1,000,000	$2,000,000
Automobile Liability – Combined Bodily Injury and Property Damage	$1,000,000	
Umbrella/Excess Liability	$1,000,000	$1,000,000
Worker's Compensation & Employer's Liability	$500,000 (Each Accident) $500,000 (Disease Policy Limit) $500,000 (Disease Each Employee)	

    Each such certificate shall list Groundwork Rhode Island as an additional insured and contain a statement of the insurer's obligation to notify Groundwork Rhode Island at least fifteen (15) days prior to cancellation of any policy covered there under. Groundwork Rhode Island shall be furnished with a Certificate of Insurance. In the event Groundwork Rhode Island is required to defend itself, the Successful Bidder shall reimburse Groundwork Rhode Island's costs, including reasonable attorneys' fees for defense of such liabilities which arise out of the Successful Bidder's negligence. In any claim which may arise as a result of intentional or negligent acts or omissions of the Successful Bidder, the Comprehensive General liability insurance policy provided by successful Bidder shall be deemed primary protection against such claims and Groundwork Rhode Island shall not be called upon to contribute to a loss otherwise payable by the Successful Bidder's insurer due to its insured's act or omission.

15. Indemnification – To the fullest extent permitted by law, Successful Bidder does agree to defend, indemnify and hold harmless Groundwork Rhode Island, its officers, agents and employees, from and against all claims, damages, losses or expenses, just or unjust, including but not limited to costs of defense, arising out of or resulting from the performance of services hereunder, provided that any such claim, damage, loss or expense is caused in whole or in part by any negligent act or omission of Successful Bidder, its officers, agents or employees, anyone directly employed by it, or anyone for whose act it may be liable, except to the extent that said claim, damage, loss or expense is caused by Groundwork Rhode Island, its officers, or employees.

END OF SECTION

CITY OF PROVIDENCE

NOTICE TO VENDORS: The City of Providence is contributing funds to this project. Based on the funding sources associated with this project, the following terms are applicable to this RFP and the awarded vendor's performance.

1. The award will be made to the lowest responsible bidder.
2. In determining the lowest responsible bidder, cash discounts based on preferable payment terms will not be considered.
3. Where prices are the same, the entity issuing this RFP (issuing entity) may award one bidder or the award may be split.
4. No proposal will be accepted if the bid is made in collusion with any other bidder.
5. Bids may be submitted on an "equal in quality" basis. The issuing entity reserves the right to decide equality. Bidders must indicate brand or the make being offered and submit detailed specifications if other than brand requested.
6. A bidder who is an out-of-state corporation shall qualify or register to transact business in this State, in accordance with the Rhode Island Business Corporation Act, RIGL Sec. 7-1.2-1401, et seq.
7. The issuing entity reserves the right to reject any and all bids.
8. Competing bids may be viewed on the issuing entity's website within five business days of the conclusion of the bids being unsealed and opened.
9. As the City of Providence and the issuing entity are exempt from the payment of Federal Excise Taxes and Rhode Island Sales Tax, prices quoted are not to include these taxes.
10. In case of error in the extension of prices quoted, the unit price will govern.
11. The contractor will NOT be permitted to: a) assign or underlet the contract, or b) assign either legally or equitably any monies or any claim thereto without the previous written consent of the issuing entity and the City Purchasing Director.
12. Delivery dates must be shown in the bid. If no delivery date is specified, it will be assumed that an immediate delivery from stock will be made.
13. For many contracts involving construction, alteration and/or repair work, State law provisions concerning payment of prevailing wage rates apply (RIGL Sec. 37-13-1 et seq.)
14. No goods should be delivered, or work started without a Purchase Order.
15. Awards will be made within ninety (90) days of bid opening. All bid prices will be considered firm, unless qualified otherwise. Requests for price increases will not be honored.
16. Failure to deliver within the time quoted or failure to meet specifications may result in default in accordance with the general specifications. It is agreed that deliveries and/or completion are subject to strikes, lockouts, accidents, and Acts of God.
17. Only one shipping charge will be applied in the event of partial deliveries for blanket or term contracts.
18. Prior to commencing performance under the contract, the successful bidder shall attest to compliance with the provisions of the Rhode Island Worker's Compensation Act, RIGL 28-29-1, et seq. If exempt from compliance, the successful bidder shall submit a sworn Affidavit by a corporate officer to that effect, which shall accompany the signed contract.
19. Prior to commencing performance under the contract, the successful bidder shall attest to compliance with the provisions of the Solid Waste Infrastructure for Recycling Grants Programmatic Terms and Conditions (02/2024), attached.
20. Prior to commencing performance under the contract, the successful bidder shall attest to compliance with the provisions of the Build America, Buy America – Required Use of American Iron, Steel, Manufactured Products, and Construction Materials (effective October 23, 2023, and forward), attached.
21. Schedule of Values: Use the attached Schedule of Values (Bid Form D) to outline the bid pricing.

SUPPLEMENTAL INFORMATION

If the issuing entity determines that your firm's bid is best suited to accommodate their need, you will be asked to provide proof of the following prior to formalizing an award: Business Tax ID; A certificate of insurance, in a form and in an amount satisfactory to the issuing entity and/or the City; and a Certificate of Good Standing with the Rhode Island Secretary of State.

This information is NOT requested to be provided in your initial bid. This list only serves as a list of items that your firm should be ready to provide on request. An inability to provide the outlined items at the request of the issuing entity may lead to the disqualification of your bid.

BID FORM A: Certification of Bidder

Bidder must certify that it does not unlawfully discriminate on the basis of race, color, national origin, gender, gender identity or expression, sexual orientation and/or religion in its business and hiring practices and that all of its employees are lawfully employed under all applicable federal, state and local laws, rules and regulations.

Upon behalf of_____ (Firm or Individual Bidding),

I, _____ (Name of Person Making Certification),

being its _____ (Title or "Self"), hereby certify that:

- Bidder does not unlawfully discriminate on the basis of race, color, national origin, gender, gender identity or expression, sexual orientation and/or religion in its business and hiring practices. All of Bidder's employees have been hired in compliance with all applicable federal, state and local laws, rules and regulations.

I affirm by signing below that I am duly authorized on behalf of Bidder, on this _____ day of _____ 20_____.

_____
Signature of Representation

_____
Printed Name

BID FORM B: Certificate Regarding Public Records

All bids submitted to the issuing entity of this RFP become public record. Failure to follow instructions could result in information considered private being made available as a public record. The issuing entity requests that sensitive information be submitted only at their request.

Upon behalf of_____ (Firm or Individual Bidding),

I, _____ (Name of Person Making Certification),

being its _____ (Title or "Self"), hereby certify an understanding that:

1. All bids submitted in response to Requests for Proposals (RFP's) and Requests for Qualification (RFQ's), documents contained within, and the details outlined on those documents become public record upon receipt by the entity issuing this RFP and passage of the bid due date and time.
2. The entity issuing this RFP has made a conscious effort to request that sensitive/personal information be submitted only upon request if verification of specific details is critical the evaluation of a vendor's bid.
3. The requested supplemental information may be crucial to evaluating bids. Failure to provide such details may result in disqualification, or an inability to appropriately evaluate bids.
4. If sensitive information that has not been requested is enclosed or if a bidder opts to enclose the defined supplemental information prior to the issuing entity's request in the bidding packet submitted to the issuing entity, the issuing entity is not obligation to redact those details and bears no liability associated with the information becoming public record.

I affirm by signing below that I am duly authorized on behalf of Bidder, on this _____ day of _____, 20_____.

_____

Signature of Representation

_____

Printed Name

BID FORM C: MBE/WBE Participation Plan

The City of Providence has a 20% MBE/WBE combined participation goal. Please complete the MBE/WBE Participation Plan form to help the City track progress toward this goal.

Please complete separate forms for each MBE/WBE subcontractor/supplier to be utilized on the solicitation.

Bidder's Name:	
Bidder's Address:	
Point of Contact:	
Telephone:	
Email:	
Project Name:	
Which one of the following describes your business' status in terms of Minority and/or Woman Owned Business Enterprise certification with the State of Rhode Island? (Check all that apply).	☐MBE ☐ WBE ☐Neither MBE nor WBE

This form is intended to capture commitments between the prime contractor/vendor and MBE/WBE subcontractors and suppliers, including a description of the work to be performed and the percentage of the work as submitted to the prime contractor/vendor. Please note that all MBE/WBE subcontractors/suppliers must be certified by the Office of Diversity, Equity and Opportunity at the time of bid. The searchable MBE/WBE Directory can be found here. Nonprofit organizations are not required to complete the rest of this form.

Name of Subcontractor/Supplier:					
Type of RI Certification:	☐MBE ☐WBE ☐Neither				
Address:					
Point of Contact:					
Telephone:					
Email:					
Detailed Description of Work to Be Performed by Subcontractor or Materials to be Supplied by Supplier Per the Scope of Work provided in the RFP					
Total Contract Value ($):		Subcontract Value ($):		Participation Rate (%):	
Anticipated Date of Performance:					

I certify under penalty of perjury that the forgoing statements are true and correct.

Prime Contractor/Vendor Signature	Title	Date
Subcontractor/Supplier Signature	Title	Date

MBE/WBE Explanation of Failure to Meet MBE/WBE Participation Goal Form

Fill out this form only if you did not meet the 20% MBE/WBE participation goal.
State-certified MBE or WBE Prime Bidders are NOT REQUIRED to fill out this form.

Prime Bidder: _____ Contact Email and Phone_____
Company Name, Address: _____ Trade _____
Project /Item Description (as seen on RFP):

_____

_____

List the certified MBE and/or WBE companies you contacted, the name of the primary individual with whom you interacted, and the reason the MBE/WBE company could not participate on this project.

MBE/WBE Company Name	Individual's Name	Why did you choose not to work with this company?

I acknowledge the City of Providence's goal of a combined MBE/WBE participation is 20% of the total bid value and my firm's bid does not meet this goal. If an opportunity is identified to subcontract any task associated with the fulfillment of this contract, a good faith effort will be made to select MBE/WBE certified businesses as partners.

_____ _____ _____
Signature of Prime Contractor / Signed or Duly Authorized Representative | Printed Name | Date

BID FORM D: SCHEDULE OF VALUES

Project Name: West End Compost Hub

Owner: Groundwork Rhode Island

Bidder:

Task #	Task Name	Labor Value	Material Value	Total
1	Temporary Facilities and Controls			
2	Demolition			
3	Subsurface Investigation			
4	Site Built Earth Flow Compost Auger			
5	Cast-In-Place Concrete			
6	Unit Masonry			
7	Metal Fabrications			
8	Interior Architectural Woodwork			
9	Thermal and Moisture Protection			
10	Doors & Windows			
11	Painting			
12	Specialties			
13	Greenhouse (Aluminum)			
14	Greenhouse (Steel)			
15	Facility Water Distribution			
16	Unit Heaters			
17	Electrical			
18	Site Clearing			
19	Earthwork			
20	Erosion And Sedimentation Controls			
21	StormTech Underground Stormwater System			
22	Focal Point Stormwater Management			
23	Clean Fill			
24	Geotextile Fabric			
25	Asphalt And Concrete Cap			
26	Site Improvements			
27	Galvanized Chain Link Fence And Rolling Gates			
28	Planting			
29	Utility Connection – Electrical			
30	Utility Connection – Water			
31	Utility Connection – Sewer			
32	Solar Energy Electrical Power Generation Equipment			
33	Clean up			
	TOTAL			

I agreee that the current costs alocated represents an accurate estimate for the project.

Owner

Date

Contractor

Date

Note: Groundwork Rhode Island has received different funding sources for various aspects of the project. Therefore, all project tasks need to be itemized.

Grant-Specific Programmatic Terms and Conditions for EPA Community Grants;
Solid Waste Infrastructure for Recycling Grants Programmatic Terms and Conditions (02/2024)

Investing in America Signage

(1) Signage Requirements:

a. Investing in America Emblem: The recipient will ensure that a sign is placed at construction sites supported in whole or in part by this award displaying the official Investing in America emblem and must identify the project as a "project funded by President Biden's Bipartisan Infrastructure Law" or "project funded by President Biden's Inflation Reduction Act" as applicable. The sign must be placed at construction sites in an easily visible location that can be directly linked to the work taking place and must be maintained in good condition throughout the construction period. The recipient will ensure compliance with the guidelines and design specifications provided by EPA for using the official Investing in America emblem available at: https://www.epa.gov/invest/investingamerica-signage.

b. Procuring Signs: Consistent with section 6002 of RCRA, 42 U.S.C. 6962, and 2 CFR 200.323, recipients are encouraged to use recycled or recovered materials when procuring signs. Signage costs are considered an allowable cost under this assistance agreement provided that the costs associated with signage are reasonable. Additionally, to increase public awareness of projects serving communities where English is not the predominant language, recipients are encouraged to translate the language on signs (excluding the official Investing in America emblem or EPA logo or seal) into the appropriate non-English language(s). The costs of such translation are allowable, provided the costs are reasonable.

Davis-Bacon Labor Standards Term and Condition

(1) Program Applicability:

a. Program Name: Solid Waste Infrastructure for Recycling Grants.

b. Statute requiring compliance with Davis-Bacon: Save our Seas 2.0 Act (Public Law 116-224) as codified at 33 USC 4282 Sec. 302(e)(1)

c. Activities subject to Davis-Bacon: Activities subject to Davis-Bacon include certain construction costs and contractual costs. Construction costs may include site preparation, demolishing and building facilities, making permanent improvements to facilities or other real property, remediation of contamination and related architectural or engineering services. With very few exceptions, recipients carry out construction projects by hiring contractors which typically include a general contractor and an architectural or engineering firm for design work and in some cases purchasing equipment for installation at the site. Hiring general contractors and other contractors performing activities described in the EPA Disadvantaged Business Enterprise (DBE) rule's definition of *Construction* at 40 CFR 33.103 will be categorized as "Construction."

d. Prevailing Wage Classification: Building

(2) Davis-Bacon and Related Acts

Davis-Bacon and Related Acts (DBRA) is a collection of labor standards provisions administered by the Department of Labor, that are applicable to grants involving construction. These labor standards include the:

- Davis-Bacon Act, which requires payment of prevailing wage rates for laborers and mechanics on construction contracts of $2,000 or more.

- Copeland "Anti-Kickback" Act, which prohibits a contractor or subcontractor from inducing an employee into giving up any part of the compensation to which he or she is entitled; and

- Contract Work Hours and Safety Standards Act, which requires overtime wages to be paid for over 40 hours of work per week, under contracts in excess of $100,000

(3) Recipient Responsibilities When Entering Into and Managing Contracts:

a. Solicitation and Contract Requirements:

i. Include the Correct Wage Determinations in Bid Solicitations and Contracts: Recipients are responsible for complying with the procedures provided in 29 CFR 1.6 when soliciting bids and awarding contracts.

ii. Include DBRA Requirements in All Contracts: Include the following text on all contracts under this grant:

"By accepting this contract, the contractor acknowledges and agrees to the terms provided in the DBRA Requirements for Contractors and Subcontractors Under EPA Grants."

b. After Award of Contract:

i. Approve and Submit Requests for Additional Wages Rates: Work with contractors to request additional wage rates if required for contracts under this grant, as provided in 29 CFR 5.5(a)(1)(iii).

ii. Provide Oversight of Contractors to Ensure Compliance with DBRA Provisions: Ensure contractor compliance with the terms of the contract, as required by 29 CFR 5.6.

(4) Recipient Responsibilities When Establishing and Managing Additional Subawards:

a. Include DBRA Requirements in All Subawards (including Loans):
Include the following text on all subawards under this grant:

"By accepting this award, the EPA subrecipient acknowledges and agrees to the terms and conditions provided in the DBRA Requirements for EPA Subrecipients."

b. Provide Oversight to Ensure Compliance with DBRA Provisions: Recipients are responsible for oversight of subrecipients and must ensure subrecipients comply with the requirements in 29 CFR 5.6.

(5) The contract clauses set forth in this Term & Condition, along with the correct wage determinations, will be considered to be a part of every prime contract covered by Davis-Bacon and Related Acts (see 29 CFR 5.1), and will be effective by operation of law, whether or not they are included or incorporated by reference into such contract, unless the Department of Labor grants a variance, tolerance, or exemption. Where the clauses and applicable wage determinations are effective by operation of law under this paragraph, the prime contractor must be compensated for any resulting increase in wages in accordance with applicable law.

Grant-Specific Programmatic Terms and Conditions for EPA Community Grants:
Build America, Buy America – Required Use of American Iron, Steel, Manufactured Products, and Construction Materials (effective October 23, 2023, and forward)

Buy America Preference. Recipients of an award of Federal financial assistance from a program for infrastructure are hereby notified that none of the funds provided under this award may be used for an infrastructure project unless:

(1) All iron and steel used in the project are produced in the United States—this means all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States;

(2) All manufactured products used in the project are produced in the United States— this means the manufactured product was manufactured in the United States; and the cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product, unless another standard that meets or exceeds this standard has been established under applicable law or regulation for determining the minimum amount of domestic content of the manufactured product; and

(3) All construction materials are manufactured in the United States—this means that all manufacturing processes for the construction material occurred in the United States. The construction material standards are listed below.

Incorporation into an infrastructure project. The Buy America Preference only applies to articles, materials, and supplies that are consumed in, incorporated into, or affixed to an infrastructure project. As such, it does not apply to tools, equipment, and supplies, such as temporary scaffolding, brought to the construction site and removed at or before the completion of the infrastructure project. Nor does a Buy America Preference apply to equipment and furnishings, such as movable chairs, desks, and portable computer equipment, that are used at or within the finished infrastructure project, but are not an integral part of the structure or permanently affixed to the infrastructure project.

Categorization of articles, materials, and supplies. An article, material, or supply should only be classified into one of the following categories:

(i) Iron or steel products;

(ii) Manufactured products;

(iii) Construction materials; or

(iv) Section 70917(c) materials.

An article, material, or supply should not be considered to fall into multiple categories. In some cases, an article, material, or supply may not fall under any of the categories listed in this paragraph. The classification of an article, material, or supply as falling into one of the categories listed in this paragraph must be made based on its status at the time it is brought to the work site for incorporation into an infrastructure project. In general, the work site is the location of the infrastructure project at which the iron, steel, manufactured products, and construction materials will be incorporated.

Application of the Buy America Preference by category. An article, material, or supply incorporated into an infrastructure project must meet the Buy America Preference for only the single category in which it is classified.

Determining the cost of components for manufactured products. In determining whether the cost of components for manufactured products is greater than 55 percent of the total cost of all components, use the following instructions:

(a) For components purchased by the manufacturer, the acquisition cost, including transportation costs to the place of incorporation into the manufactured product (whether or not such costs are paid to a domestic firm), and any applicable duty (whether or not a duty-free entry certificate is issued); or

(b) For components manufactured by the manufacturer, all costs associated with the manufacture of the component, including transportation costs as described in paragraph (a), plus allocable

overhead costs, but excluding profit. Cost of components does not include any costs associated with the manufacture of the manufactured product.

Construction material standards. The Buy America Preference applies to the following construction materials incorporated into infrastructure projects. Each construction material is followed by a standard for the material to be considered "produced in the United States." Except as specifically provided, only a single standard should be applied to a single construction material.

(1) Non-ferrous metals. All manufacturing processes, from initial smelting or melting through final shaping, coating, and assembly, occurred in the United States.

(2) Plastic and polymer-based products. All manufacturing processes, from initial combination of constituent plastic or polymer-based inputs, or, where applicable, constituent composite materials, until the item is in its final form, occurred in the United States.

(3) Glass. All manufacturing processes, from initial batching and melting of raw materials through annealing, cooling, and cutting, occurred in the United States.

(4) Fiber optic cable (including drop cable). All manufacturing processes, from the initial ribboning (if applicable), through buffering, fiber stranding and jacketing, occurred in the United States. All manufacturing processes also include the standards for glass and optical fiber, but not for nonferrous metals, plastic and polymer-based products, or any others.

(5) Optical fiber. All manufacturing processes, from the initial preform fabrication stage through the completion of the draw, occurred in the United States.

(6) Lumber. All manufacturing processes, from initial debarking through treatment and planing, occurred in the United States.

(7) Drywall. All manufacturing processes, from initial blending of mined or synthetic gypsum plaster and additives through cutting and drying of sandwiched panels, occurred in the United States.

(8) Engineered wood. All manufacturing processes from the initial combination of constituent materials until the wood product is in its final form, occurred in the United States.

Waivers. When supported by rationale provided in IIJA §70914, the recipient may submit a waiver request in writing to EPA. Recipients should request guidance on the submission instructions of an EPA waiver request from the EPA Project Officer for this agreement. A list of approved EPA waivers (general applicability and project specific) is available on the EPA Build America, Buy America website.

EPA may waive the application of the Buy America Preference when it has determined that one of the following exceptions applies:

(1) applying the Buy America Preference would be inconsistent with the public interest;

(2) the types of iron, steel, manufactured products, or construction materials are not produced in the United States in sufficient and reasonably available quantities or of a satisfactory quality; or

(3) the inclusion of iron, steel, manufactured products, or construction materials produced in the United States will increase the cost of the overall project by more than 25 percent.

For questions regarding the Build America, Buy America Act requirements for this assistance agreement or to determine if there is an approved waiver in place, please contact the EPA Project Officer for this agreement.

Definitions. For legal definitions and sourcing requirements, the recipient must consult the EPA Build America, Buy America website, 2 CFR Part 184, and the Office of Management and Budget's (OMB) Memorandum M-24-02 Implementation Guidance on Application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure.

SECTION 01 30 00
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Administration of Contract: Provide administrative requirements for the proper coordination and completion of work including the following:
   1. Supervisory personnel.
   2. Preconstruction conference.
   3. Project meetings, minimum of two per month; prepare and distribute minutes.
   4. Phone numbers and address for individuals to be contacted in case of emergency.

B. Work Schedule: Submit progress schedule, updated monthly, with any special reports.

C. Submittal Schedule: Prepare submittal schedule; coordinate with progress schedule.

D. Schedule of Values: Submit schedule of values with each pay application.

E. Schedule of Tests: Submit schedule of required tests including payment and responsibility.

F. Perform Surveys: Lay out the work and verify locations during construction for Architect's approval. Perform final site survey.

G. Record Documents: Maintain a complete and updated set of drawings on site at all times. Submit record drawings and specifications at the end of the project (maintained and annotated by Contractor as work progresses).

1.2 SUBMITTALS

A. Types of Submittals: Provide types of submittals listed in individual sections and number of copies required below.
   1. Shop drawings, reviewed and annotated by the Contractor - 2 copies.
   2. Product data - 2 copies.
   3. Samples - 2, plus extra samples as required to indicate range of color, finish, and texture to be expected.
   4. Inspection and test reports - 2 copies.
   5. Warranties - 2 copies.
   6. Survey data - 2 copies.
   7. Closeout submittals - 2 copies.
   8. Project photographs – a minimum of 12 digital images each month submitted on line.

B. Submittal Procedures: Comply with project format for submittals. Comply with submittal procedures established by Architect including Architect's submittal and shop drawing stamp. Provide required resubmittals if original submittals are not approved. Provide distribution of approved copies including modifications after submittals have been approved:
   1. Samples and Shop Drawings: Samples and shop drawings shall be prepared specifically for this project. Shop drawings shall include dimensions and details, including adjacent construction and related work. Note special coordination required. Note any deviations from requirements of the Contract Documents.
   2. Warranties: Provide warranties as specified; warranties shall not limit length of time for remedy of damages Owner may have by legal statute. Contractor, supplier or installer responsible for performance of warranty shall sign warranties.

END OF SECTION

SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Quality Monitoring: Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality. Perform quality control procedures and inspections during installation.

B. Standards: Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

C. Tolerances: Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate. Comply with manufacturers' tolerances.

D. Reference Standards: For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

E. Manufacturer's Field Services: When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to perform the following as applicable, and to initiate instructions when necessary.
   1. Observe site conditions.
   2. Conditions of surfaces and installation.
   3. Quality of workmanship.
   4. Start-up of equipment.
   5. Test, adjust and balance of equipment.

F. Mock-Ups: Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes. Accepted mock-ups shall be a comparison standard for the remaining Work.

G. Removal of Mock-Ups: Where mock-up has been accepted by Architect and no longer needed, remove mock-up and clear area when directed to do so.

PART 2 PRODUCTS - Not Applicable To This Section

PART 3 EXECUTION - Not Applicable To This Section

END OF SECTION

SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SUMMARY

A. Temporary Services: Provide temporary services and utilities, including payment of utility costs including the following.
   1. Water (potable and non-potable).
   2. Lighting and power.
   3. Metering.
   4. Telephone.
   5. Toilet facilities.
   6. Materials storage.

B. Construction Facilities: Provide construction facilities, including payment of utility costs including the following.
   1. Construction equipment.
   2. Dewatering and pumping.
   3. Enclosures.
   4. Heating.
   5. Lighting.
   6. Access.
   7. Roads.

C. Security and Protection: Provide security and protection requirements including the following.
   1. Fire extinguishers.
   2. Site enclosure fence, barricades, warning signs, and lights.
   3. Building enclosure and lock-up.
   4. Temporary jobsite protection.
   5. Environmental protection.
   6. Pest control during and at the end of construction.
   7. Snow and ice removal if applicable.

D. Personnel Support: Provide personnel support facilities including the following.
   1. Contractor's field office.
   2. Sanitary facilities.
   3. Drinking water.
   4. Project identification sign.
   5. Cleaning.

PART 2 PRODUCTS

2.1 TEMPORARY BRACING

A. Temporary Bracing of Masonry Partitions: As required to stabilize construction during installation of masonry work.
   1. Manufacturer: Ram Board/Surface Shields.

2.2 TEMPORARY JOBSITE PROTECTION

A. Temporary Jobsite Protection of the Following Types:
   1. Manufacturer: Refer to Surface Shields Inc., Armorlon, Division of Reef Industries, Inc., TuffWrap.
   2. Hard surface protection.
   3. Carpet protection.
   4. Dust containment.
   5. Specialty; window, door, entry and marble protection.
   6. Adhesive tape.

PART 3 EXECUTION - Not Applicable To This Section

END OF SECTION

SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Manufactures: Provide products from one manufacturer for each type or kind as applicable. Provide secondary materials as acceptable to manufacturers of primary materials.

B. Product Selection: Provide products selected or equal approved by Architect. Products submitted for substitution shall be submitted with complete documentation, and include construction costs of substitution including related work.

C. Substitutions: Request for substitution must be in writing. Conditions for substitution include:
1. An 'or equal' phrase in the specifications.
2. Specified material cannot be coordinated with other work.
3. Specified material is not acceptable to authorities having jurisdiction.
4. Substantial advantage is offered to the Owner in terms of cost, time, or other valuable consideration.

D. Substitution Requests: Substitutions shall be submitted prior to award of contract, unless otherwise acceptable. Approval of shop drawings, product data, or samples containing substitutions is not an approval of a substitution unless an item is clearly presented as a substitution at the time of submittal.

PART 2 PRODUCTS - Not Applicable To This Section

PART 3 EXECUTION - Not Applicable To This Section

END OF SECTION

SECTION 01 70 00
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Substantial Completion: The following are prerequisites to substantial completion. Provide the following.
   1. Punch list prepared by Contractor and subcontractors as applicable.
   2. Supporting documentation.
   3. Warranties.
   4. Certifications.
   5. Occupancy permit.
   6. Start-up and testing of building systems.
   7. Change-over of locks.
   8. Meter readings.
   9. Commissioning documentation.

B. Final Acceptance: Provide the following prerequisites to final acceptance.
   1. Final payment request with supporting affidavits.
   2. Completed punch list.

C. As-Built Drawings: Provide a marked-up set of drawings including changes, which occurred during construction.

D. Project Closeout: Provide the following during project closeout.
   1. Submission of record documents.
   2. Submission of maintenance manuals.
   3. Training and turnover to Owner's personnel.
   4. Final cleaning and touch-up.
   5. Removal of temporary facilities.

PART 2 PRODUCTS - Not Applicable To This Section

PART 3 EXECUTION

3.1 CUTTING AND PATCHING

A. Cutting and Patching: Provide cutting and patching work to properly complete the work of the project, complying with project requirements for:
   1. Structural work.
   2. Mechanical/electrical systems.
   3. Visual requirements, including detailing and tolerances.
   4. Operational and safety limitations.
   5. Fire resistance ratings.
   6. Inspection, preparation, and performance.
   7. Cleaning.

B. Means and Methods: Do not cut and patch in a manner that would result in a failure of the work to perform as intended, decrease energy performance, increase maintenance, decrease operational life, or decrease safety performance.

C. Inspection: Inspect conditions prior to work to identify scope and type of work required. Protect adjacent work. Notify Owner of work requiring interruption to building services or Owner's operations.

D. Performance of Operations: Perform work with workmen skilled in the trades involved. Prepare sample area of each type of work for approval.

E. Cutting: Use cutting tools, not chopping tools. Make neat holes. Minimize damage to adjacent work. Inspect for concealed utilities and structure before cutting.

F. Patching: Make patches, seams, and joints durable and inconspicuous. Comply with tolerances for new work.

G. Cleaning: Clean work area and areas affected by cutting and patching operations.

END OF SECTION

SECTION 01 90 00
LIFE CYCLE ACTIVITIES

PART 1 GENERAL

1.1 SUMMARY

A. Commissioning: Provide commissioning of building systems, subsystems and equipment including:
   1. HVAC components and equipment.
   2. Building automation systems.
   3. Lighting control systems.
   4. Composting Auger.

B. Commissioning Agent: The Owner will engage a commissioning agent to prepare a commissioning plan and report, and to perform functional tests and inspections of building systems.

C. Cooperation: Cooperate with the Owner's commissioning agent, including attendance at commissioning meetings and activities, coordinating scheduling, access to the work and utility services for commissioning activities.

D. Access: Provide access to project documentation, shop drawings, wiring diagrams, operations and maintenance manuals and similar items when requested by the Owner's commissioning agent.

E. Remedial Work: Modify, adjust, balance, repair or replace systems, subsystems and equipment which does perform to code requirements or to requirements specified in the Contract Documents at no additional expense to the Owner. Pay for retesting and additional modifications until satisfactory results are obtained.

PART 2 PRODUCTS - Not Applicable To This Section

PART 3 EXECUTION - Not Applicable to This Section

END OF SECTION

SECTION 02 30 00
SUBSURFACE INVESTIGATION

PART 1 GENERAL

1.1 SUMMARY

A. Geotechnical Report: A copy of the geotechnical report and boring logs are available from the Architect and Owner.

B. Information Not Guaranteed: Information on the Drawings and in the Project Manual relating to subsurface conditions and existing utilities and structures is from information available from sources available to the Owner's engineering consultants. Such information is furnished only for the information and convenience of the Contractor, and the accuracy or completeness of this information is not guaranteed.

PART 2 PRODUCTS - Not Applicable To This Section

PART 3 EXECUTION - Not Applicable to This Section

END OF SECTION

SECTION 03 30 00
CAST-IN-PLACE-CONCRETE

PART 1 GENERAL

1.1 SUMMARY

A. Provide cast-in-place concrete, reinforcing and accessories.

B. Refer to the structural drawings for additional requirements.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.
   1. Shop drawings shall be prepared and stamped by a qualified engineer licensed in the jurisdiction of the project.

C. Mix Design: Submit for approval mix design proposed for use.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. Testing: Employ an independent testing agency acceptable to Owner to design concrete mixes and to perform material evaluation tests. Provide 7, and 28 day cylinder tests. Comply with ASTM C 143, C 173, C 31 and C 39.

C. Standards:
   1. ACI 301, Specifications for structural Concrete for Buildings.
   2. ACI 318, Building Code Requirements for Reinforced Concrete, and CRSI Manual of Standard Practice.

D. Mock-Ups: Provide mock-up as required to demonstrate quality of workmanship.

E. Floor Flatness and Levelness Tolerances:
   1. Subfloors Under Materials Such as Concrete Toppings, Ceramic Tile, and Sand Bed Terrazzo: ACI 302.1R and ASTM E 1155, floor flatness (Ff) of 15, floor levelness (Fl) of 13.
   2. Subfloors Under Materials Such As Vinyl Tile, Epoxy Toppings, Paint, and Carpet: ACI 302.1R and ASTM E 1155, floor flatness (Ff) of 20, floor levelness (Fl) of 17.

PART 2 PRODUCTS

2.1 MATERIALS

A. Note that for all applications below, use the following material specifications:
   1. Post-Consumer Recycled Supplementary Cementitious Materials.
   2. Recycled ground glass pozzolan shall be the approved or equal of Pozzotive as manufactured by Urban Mining CT.
   3. Conforms to ASTM C 1866.Specific Requirements Cementitious material shall contain

up to 50% post-consumer supplementary cementitious material with a minimum of 15%. NOTE: The actual cement replacement rate will depend on the requirements of the hardened concrete or the cured concrete masonry units as well as the Global Warming Potential reduction target.

B. Cast-In-Place Concrete:
1. Manufacturers: Concrete Forming and Accessories: Architectural Polymers; ISE Logik Industries; MAPEI; Solomon Colors; Spec Formliners, Inc.
2. Manufacturers: Concrete Anchoring: Refer to www.arcat.com/divs/sec/sec03300.html
3. Manufacturers: High Tolerance Floor Treatment: ISE Logik Industries.
4. Manufacturers: Concrete Finishes: EPMAR Corporation; LATICRETE International, Inc.
5. Manufacturers: Concrete Curing, Sealing and Hardening: ISE Logik Industries.
6. Manufacturers: Cement Grouts, Adhesives and Sealants: MAPEI.
7. Application: Columns and beams, Foundations and footings, Concrete on metal deck, and Exterior site concrete and pads.
8. Finish for Vertical Surfaces Exposed To View: Smooth rubbed finish.
9. Finish for Vertical Surfaces Not Exposed To View: As-cast form finish.
10. Finish for Horizontal Surfaces To Receive Concrete or Mortar Setting Bed: Scratch finish.
11. Finish for Surfaces to Receive Thin-set Ceramic or Quarry Tile: Trowel and fine broom finish.
12. Finish for Exterior Concrete Platforms, Steps, Ramps and Sloped Walls: Non-slip broom finish.
13. Cast-In-Place Concrete Reinforcing and Accessories:
    a. Concrete Design Mixes: ASTM C 94, 28-day compressive strength suitable for project requirements and site conditions.
    b. Formwork: Plywood or metal panel formwork sufficient for structural and visual requirements.
    c. Reinforcing Bars: ASTM A 767, Class II, galvanized.
    d. Steel Wire: ASTM A 82.
    e. Steel Wire Fabric: ASTM A 497, welded, deformed.
    f. Concrete Materials: ASTM C 150, Type I, Portland cement; potable water.
    g. Concrete Admixtures: Containing less than 0.1 percent chloride ions.
    h. Reglets: Galvanized sheet steel reglets, minimum 26 gauge (.018 inch).
    i. Waterstops: Rubber, PVC or self-expanding butyl/bentonite waterstops.
    j. Vapor Retarder: ASTM D 4397 polyethylene sheet, 10 mils.
    k. Liquid Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class A.
    l. Underlayment Compound: Free-flowing, self-leveling cement-based compound.
    m. Bonding Compound: Polyvinyl acetate or acrylic base.
    n. Epoxy Adhesive: ASTM C 881, two-component material.

B. Concrete Sealers
1. Acri-soy by Ecoprocote (or equal)

PART 3 EXECUTION

3.1 INSTALLATION

A. Comply with ASTM C 94. Do not change mix design without approval. Calcium chloride admixtures are not permitted.

B. Chamfer exposed edges/corners to provide straight lines.

C. Tolerance: Plus 1/8" in 10" for grade, alignment, and straightness.

D. Construction Joints: Use keyways, continue reinforcement through joint.

E. Expansion Joints: For exterior work locate 30' o. c. at approved locations. Provide smooth dowels across joint which permit 1" horizontal movement and no vertical shear movement.

F. Isolation Joints: Provide between slabs and vertical elements such as columns and structural walls.

G. Control Joints: Provide sawn or tooled joints or removeable insert strips; depth equal to 1/4 slab thickness. Spacing as required and approved.

H. Wall Finishes: As-cast and patched for concealed work; rubbed smooth, filled and cement paste coated for exposed work.

I. Slab Finishes: Obtain sample approval before beginning work.
   1. Scratch: For surfaces to receive mortar setting beds or cementitious flooring materials.
   2. Trowel: Hard, smooth, uniform surface for areas to receive resilient flooring, carpet, or other thin finish material.
   3. Broom: After trowel finishing, roughen surface by fine brooming perpendicular to traffic direction for exposed exterior walks, steps and ramps.
   4. Non-Slip Aggregate: After trowel finishing, uniformly trowel 25-lbs./100 s. f. of damp non-slip aggregate into surface. Cure, then rub lightly to expose aggregate. Use for interior exposed concrete stairs and ramps.
   5. Exposed Aggregate: Use chemical retarder or tamp aggregate into wet concrete and expose by brushing with water. Use where indicated.
   6. Hardener Finish: For exposed interior concrete floors. Follow manufacturer's directions.

J. Cure and protect work. Report defective work in writing.

END OF SECTION

SECTION 04200
UNIT MASONRY

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Lightweight Concrete masonry w all units (CMU's) with Pozzotive.

1.02 SUBMITTALS

A. Samples: Submit samples to Architect for review prior to constructing job-site mock-ups, delivering materials to Site or commencing Work in this Section.

1. Provide samples of each type and weight classification of concrete masonry units, to be used on Project showing range of texture and/or color variations of exposed surfaces for units.

2. Units provided to Project shall match these samples.

B. Product Data: Indicate methods of fabrication and installation for the insulated concrete masonry units.

C. Certificates: Submit certification to the Architect prior to deliver y o f concrete masonry units to jobsite, signed by Concrete Masonry Unit Manufacturer, stating that the concrete masonry units to be supplied:

1. shall meet the specified requirements for concrete masonry units for exterior building w all construction, and;

2. are suitable for proposed usage.

D. Test Reports:

1. Submit test results for concrete masonry units for exterior building wall construction to be used to Architect in accordance with specifications.

2. Test results shall clearly indicate:

a. Types of materials and composition.

b. Classification of concrete masonry unit in accordance with ASTM C90 requirements.

1.02 QUALITY ASSURANCE

A. Standards:

1. Comply with the requirements of ACI 5 30.1/ASCE6/TMS 602 unless modified by requirements in the Contract Documents.

B. Regulatory Requirements: Masonry materials and workmanship shall meet requirements of building codes, which are applicable to jurisdiction in which Project is located.

C. Pre-installation Meetings:

1. A preconstruction meeting between the electrician and the mason shall be conducted to ensure that the electrical plan is accurate and complete.

2. A preconstruction meeting between the window and door supplier and the mason shall be conducted to coordinate the installation of windows and doors.

3. A preconstruction meeting between the plumber and the mason shall be conducted to ensure that the plumbing plans (water and waste) are accurate and complete.

4. A preconstruction meeting between other subcontractors/ suppliers (that will have embeds within the masonry) and the mason shall be conducted to ensure that the location of the embeds are understood and that plans regarding those embeds are accurate and complete.

1.03 DELIVERY, STORAGE AND HANDLING

A. Transport and handle masonry units in such a manner as to prevent chipping and breakage. Complying with ASTM C 9 0 standards section 7.1, 7.2, 7.2.1.

B. Deliver and store materials in dry, protected areas.

C. Keep free of stain or other damage.

1.04 PROJECT/SITE CONDITIONS

A. Hot Weather Requirements:

1. Comply with hot-weather construction requirements contained in ACI 5 30.1/ASCE 6 /TMS 602.

2. Do not spread mortar beds more than 4 feet ahead of placing block units.

3. Place block units within one minute of spreading mortar.

B. Hot Weather Requirements:

1. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

2. Fully protect concrete masonry units against freezing by a weather-tight covering, which shall also prevent accumulation of ice.

3. Do not lay concrete masonry units when temperature of surrounding atmosphere is below 40 Degrees and rising, unless adequate protection is provided.

C. Field Measurements:

1. Verify measurements shown on Drawings by taking field measurements.

2. Proper fit and attachment of concrete masonry units is required.

1.06 SCHEDULING AND SEQUENCING

A. Coordination: Coordinate with other Trades whose Work relates to concrete masonry unit installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Lightweight Concrete Masonry wall Units with Pozzotive shall be as manufactured by The Westbrook Concrete Block Co., Inc. – 479 Spencer Plains Road – Westbrook, CT 06498 Phone 860-399-6201 or a comparable product deemed equal by the Architect.

B. Lightweight aggregate shall be 100% expanded shale produced by the rotary kiln process complying with A .S.T.M. C-331 with a gradation of No. 4 to 0, Table 1 o f A .S.T.M. C-331, aggregate as manufactured by the Norlite Corporation. Dry net weight of less than 90 pcf, blended with normal weight aggregate conforming to A .S.T.M. C-33.

2.02 MATERIALS

A. General Requirements for Lightweight Concrete Masonry Units with Pozzotive.

1. Concrete masonry units shall meet ASTM C90 requirements.

2. Finishes and appearance will comply with ASTM C90 standards section 7.1, 7.2, 7.2.1.

3. Units shall be in the same condition in wall a s they were upon delivery.

4. Block Design: a. Unit sizes shall be as shown on Drawings.

5. Surface of units shall be clean and free from dirt when laid in walls.

6. Provide special b lock sizes and shapes required or as shown on Drawings.

7. Accessory Units: Provide units a s required for window sills and jambs, doors, control joints, bond beams, lintels, pilaster, caps and other locations a s indicated on Drawings with a minimum of b lock cutting.

8. All concrete block shall be manufactured with Pozzotive. Pozzotive is a high performance Supplementary Cementitious Material, made from 100% recycled post-consumer g lass. This glass is diverted from multiple post-consumer waste streams, including bottle redemption and curbside pickup. The Pozzotive replaces up to 30% of the Portland cement used in the manufacture of concrete b lock. This recycled content will contribute toward LEED Materials & Resource Credits 4 .1 & 4 .2

9. Substitutions: Not permitted.

2.03 ACCESSORIES

A. Reinforcing Steel: As specified under Section 03200.

B. Control Joints:

1. Rubber: Extruded, solid section, ASTM D2000 2AA-805 with a durometer hardness of 70 or 80 when tested per ASTM D2240.

2. Polyvinyl Chloride (PVC): A STM D2287, Type PVC 6 54-4 with a durometer hardness of 85 (+5) when tested per ASTM D2240, minimum tensile strength of 1750 psi with minimum 300 percent elongation per ASTM D638, and cold crack brittleness of 50 degrees F per ASTM D746.

3. Sizes and Profiles: As indicated on Drawings.

C. Mortar and Grout: A s specified under Section 04065.

D. Substitutions: Not permitted.

E. Surface Bond (if required): Cementitious, fiber reinforced compound that has epoxies, water proofers, and Silica sand a s its main ingredients. Supply in p re-mixed bags that require water as the only additive.

F. Masonry Wall Insulation:

1. Molded Expanded Polystyrene (EPS) inserts manufactured by Omni Block Inc.

2. R -4 per inch.

3. UL Listed “non-toxic” product.

4. Recyclable.

5. Non-CFC.

6. Fluted for moisture migration.

7. Designed and sized to fit into Omni Block’s designed cavity in block for inserts.

8. Inserts are to include non-mortar interfering indents (vertically and horizontally).

G. Steel Lintels: As indicated or scheduled on Structural Drawings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Installer shall examine supporting structure and conditions under which unit masonry is to be installed, and notify Contractor, in writing, conditions detrimental to p roper and timely completion of Work. Do not proceed with the installation of unit masonry Work until unsatisfactory conditions have been corrected in a manner acceptable to Installer. Finish and appearance of CMU’s will comply with ASTM C90 standard section 7.1, 7.2, 7.2.1.

B. Do not build on frozen Work; remove and replace unit masonry Work damaged by frost or freezing.

C. Do not use frozen materials or materials mixed or coated with ice or frost. Do not lower freezing point of mortar by use of admixtures or anti-freeze agents, and do not use calcium chloride in mortar or grout.

3.02 PREPARATION

A. Protection: Protect sills, ledges, offsets and other projections from dropping of mortar and grout.

3.03 ERECTION, INSTALLATION, APPLICATION

A. General requirements for concrete masonry walls:

1. Workmanship: Provide Standard Level workmanship and select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

2. Lay units in uniform and true courses, level and plumb to height indicated on Drawings.

3. Insulation Inserts:

a. Insulation inserts shall be placed in all exterior cells and shall be installed in interior cells that are not filled with grout and rebar as the wall is laid up (each course).

b. Interior inserts shall overlap from block-to-block a t each course of block.

4. Lay concrete unit masonry in such a w ay that cracks are not formed at time unit is placed in wall.

5. Units shall not be wetted before being u sed and shall be laid dry.

6. Adjusting Units:

a. Units shall be adjusted to be level, plumb and straightened into final position in w all while mortar is still soft and plastic enough to ensure a good bond.

b. Avoid over-plumbing and pounding of corners and jambs to fit stretcher units after they are set in position.

c. If position of unit is shifted after mortar has stiffened, or bond is broken or cracks are formed, re-lay unit in new mortar.

7. Bearings on Walls: Provide 3 courses of solid units or grouted hollow masonry units below s teel bearing p lates or beams bearing on walls. Extend bearings each s ide of contact with load a s required to properly transfer loads into wall.

8. Openings: Provide openings in masonry walls where required or indicated. Steel lintels shall be provided unless otherwise noted.

9. Cutting of masonry: When required, exposed block units shall be cut with a power d riven Carborundum or diamond disc b lade saw. When using “wet” cutting methods, clean water shall b e u sed on exposed units.

10. Bond pattern shall be regular running bond unless indicated otherwise on the drawings. Bond shall be plumb throughout face of wall.

11. Tolerances: Standard Level of Quality for dimension and locations of elements, lines and levels, and joints.

B. Bonding

1. Bond pattern shall be regular running bond unless indicated otherwise on the drawings.

2. Bond shall be plumb throughout face of wall.

C. Bearing Wall Intersections:

1. Intersecting block bearing walls shall not be tied together in a masonry bond, except at corners.

2. One wall shall terminate at face of other w all with a control joint at intersection.

3. Provide sealing of control joint a s specified in Section 07900.

D. Control Joints:

1. Provide control joints, as detailed, at vertical masonry walls where such walls exceed 40 feet in length. In long length of walls, provide joints at approximately 24 feet on center or as detailed.

2. Control joints shall be continuous full height of walls.

3. At bond beams, control joints shall separate both block and grout; however, steel reinforcing shall be continuous.

4. Control joints shall not occur at wall corners, intersections, ends, within 24 inches of concentrated points of bearing or jambs or over openings unless specifically indicated on Structural Drawings.

5. Control joint materials shall be held back from finished surface a s required to allow for sealant and back-up materials.

E. Vertical Reinforcing and Bond Beam Reinforcing:

1. Place in accordance with requirements of Drawings.

2. Vertical Reinforcement: Provide continuous reinforcing full height of wall at wall ends, corners, intersections, jambs of openings and each side of control joints. Vertical reinforcing shall match and lap dowels which are at top of foundation walls and precast concrete beams.

3. Bond Beams: Provide horizontal reinforcing of 2 bars in minimum 8-inch-deep grouted continuous bond beam at roof and elevated floor lines.

4. Parapets: Provide horizontal reinforcing of 1 bar in minimum 8-inch-deep grouted continuous bond beam at top of parapets.

5. Bond Beam and Parapet Reinforcing at Vertical Control Joints: Place bars continuous through control joint and wrap mastic tape around bars for 18-inches each side of control joint.

6. Bond Beam and Parapet Reinforcing at Corners and Wall Intersections: Provide bent bars to match reinforcing at corners and w all intersections.

7. Lap splices in reinforcing not less than 40 bar diameters for # 7 and larger bars; 30 bar diameters for # 6 and smaller bars.

8. Use spacers to position reinforcing steel in center of grout at center of wall as required by code.

F. Grouting:

1. Reinforcing steel is to be in place and inspected before g routing starts.

2. Vertical cells to be filled shall have vertical alignment to maintain a continuous cell area.

3. Keep cell to be grouted free from mortar.

4. Fill cells solidly with grout in lifts not to exceed 4-feet.

5. Grout may be poured by hand bucket, concrete hopper or through a grout pump.

6. Do not wet down grout space prior to pouring of grout.

7. Stop pours 1 -1/2 inches below top of cell to form a key at pour points.

8. Grout shall be consolidated by mechanical vibration during placing before

loss of plasticity in a manner to fill grout space. Grout pours greater than 12 inches shall be reconsolidated by mechanical vibration to minimize voids due to water loss. Grout pours 12 inches or less in height shall be mechanically vibrated, or rodded.

9. Grout barrier below bond beams shall be continuous wire lath or other approved material.

10. Grout beams over openings and bond beams in a continuous operation.

11. Solidly grout in place bolts, anchors and other items within wall construction.

12. Fully grout jambs and head of metal door frames connected to masonry. Filling of frames shall be done as each 2-feet of masonry is laid.

13. Use extreme care to prevent grout or mortar from staining face of the masonry.

14. Immediately remove grout or mortar which is visible on face of masonry.

3.04 CLEANING

A. Daily Cleaning: Keep walls clean. Soiled masonry from mortar and grout spills which will be exposed to view at completion of Project shall be cleaned immediately with stiff fiber brushes until wall is free of dropped or spattered grout.

B. Remove scaffolding and equipment used in Work.

C. Clean up debris, refuse and surplus material and remove from premises.

D. Per the Manufacturers Recommendation Prosoco Custom Masonry Cleaner is the safest, and most effective product to clean this Architectural CMU with.

3.05 PROTECTION

A. Furnish temporary protection for exposed masonry corners subject to injury.

B. Carefully cover tops of walls left incomplete a t conclusion of day’s Work with tarpaulins or other approved covering.

END OF SECTION 04200

SECTION 05 50 00
METAL FABRICATIONS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies items and assemblies fabricated from structural steel shapes and other materials as shown and specified.
B. Items specified:
   1. Support for Wall and Ceiling Mounted Items
   2. Frames
   3. Guards
   4. Covers and Frames for Pits and Trenches.
   5. Gratings
   6. Loose Lintels
   7. Shelf Angles
   8. Plate Door Sill
   12. Steel Pipe Bollards

1.2 SUBMITTALS

A. Submit in accordance with Section 01 30 00 ADMINISTRATIVE REQUIREMENTS.

B. Shop Drawings:
   1. Each item specified, showing complete detail, location in the project, material and size of components, method of joining various components and assemblies, finish, and location, size and type of anchors.
   2. Mark items requiring field assembly for erection identification and furnish erection drawings and instructions.
   3. Provide templates and rough-in measurements as required.
C. Manufacturer's Certificates:
   1. Anodized finish as specified.
   2. Live load designs as specified.
D. Design Calculations for specified live loads including dead loads.
E. Furnish setting drawings and instructions for installation of anchors to be preset into concrete and masonry work, and for the positioning of items having anchors to be built into concrete or masonry construction.

1.3 QUALITY ASSURANCE

A. Each manufactured product shall meet, as a minimum, the requirements specified, and shall be a standard commercial product of a manufacturer regularly presently manufacturing items of type specified.
B. Each product type shall be the same and be made by the same manufacturer.
C. Assembled product to the greatest extent possible before delivery to the site.
D. Include additional features, which are not specifically prohibited by this specification, but which are a part of the manufacturer's standard commercial product.

1.4 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
B. American Society of Mechanical Engineers (ASME):
   B18.6.1-97 ..... Wood Screws
   B18.2.2-87(R2010) ..... Square and Hex Nuts
C. American Society for Testing and Materials (ASTM):
   A36/A36M-14 ..... Structural Steel
   A47-99(R2014) ..... Malleable Iron Castings

A48-03(R2012) ..... Gray Iron Castings
A53-12 ..... Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
A123-15 ..... Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
A240/A240M-15 ..... Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels and for General Applications.
A269-15 ..... Seamless and Welded Austenitic Stainless-Steel Tubing for General Service
A307-14 ..... Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
A391/A391M-07(R2015) ..... Grade 80 Alloy Steel Chain
A786/A786M-15 ..... Rolled Steel Floor Plate
B221-14 ..... Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes
B456-11 ..... Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium
B632-08 ..... Aluminum-Alloy Rolled Tread Plate
C1107-13 ..... Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
F436-16 ..... Hardened Steel Washers
F468-06(R2015) ..... Nonferrous Bolts, Hex Cap Screws, Socket Head Cap Screws and Studs for General Use
F593-13 ..... Stainless Steel Bolts, Hex Cap Screws, and Studs
F1667-15 ..... Driven Fasteners: Nails, Spikes and Staples

D. American Welding Society (AWS):
D1.1-15 ..... Structural Welding Code Steel
D1.2-14 ..... Structural Welding Code Aluminum
D1.3-18 ..... Structural Welding Code Sheet Steel

E. National Association of Architectural Metal Manufacturers (NAAMM)
AMP 500-06 ..... Metal Finishes Manual
MBG 531-09(R2017) ..... Metal Bar Grating Manual
MBG 532-09 ..... Heavy Duty Metal Bar Grating Manual

F. Structural Steel Painting Council (SSPC)/Society of Protective Coatings:
SP 1-15 ..... No. 1, Solvent Cleaning
SP 2-04 ..... No. 2, Hand Tool Cleaning
SP 3-04 ..... No. 3, Power Tool Cleaning

PART 2 - PRODUCTS

2.1 DESIGN CRITERIA

A. In addition to the dead loads, design fabrications to support the following live loads unless otherwise specified.
B. Floor Plates, Gratings, Covers, Trap Doors, Catwalks, and Platforms: 500 kg/m^2 (100 pounds per square foot).

2.2 MATERIALS

A. Structural Steel: ASTM A36.
B. Stainless Steel: ASTM A240, Type 302 or 304.
C. Aluminum, Extruded: ASTM B221, Alloy 6063-T5 unless otherwise specified. For structural shapes use alloy 6061-T6 and alloy 6061-T4511.
D. Floor Plate:
   1. Steel ASTM A786.
   2. Aluminum: ASTM B632.
E. Steel Pipe (Bollard): ASTM A53.
   1. Galvanized for exterior locations.
   2. Type S, Grade A unless specified otherwise.
   3. NPS (inside diameter) as shown.

F. Cast-Iron: ASTM A48, Class 30, commercial pattern.
G. Malleable Iron Castings: A47.
I. Stainless Steel Tubing: ASTM A269, type 302 or 304.
J. Modular Channel Units:
    1. Factory fabricated, channel shaped, cold formed sheet steel shapes, complete with fittings bolts and nuts required for assembly.
    2. Form channel within turned pyramid shaped clamping ridges on each side.
    3. Provide case hardened steel nuts with serrated grooves in the top edges designed to be inserted in the channel at any point and be given a quarter turn so as to engage the channel clamping ridges. Provide each nut with a spring designed to hold the nut in place.
    4. Factory finish channels and parts with oven baked primer when exposed to view. Channels fabricated of ASTM A525, G90 galvanized steel may have primer omitted in concealed locations. Finish screws and nuts with zinc coating.
    5. Fabricate snap-in closure plates to fit and close exposed channel openings of not more than 0.3 mm (0.0125 inch) thick stainless steel.
K. Grout: ASTM C1107, pourable type.

2.3 HARDWARE

A. Rough Hardware:
    1. Furnish rough hardware with a standard plating, applied after punching, forming and assembly of parts; galvanized, cadmium plated, or zinc-coated by electro-galvanizing process. Galvanized G-90 where specified.
    2. Use G90 galvanized coating on ferrous metal for exterior work unless non-ferrous metal or stainless is used.
B. Fasteners:
    1. Bolts with Nuts:
        a. ASME B18.2.2.
        b. ASTM A307 for 415 MPa (60,000 psi) tensile strength bolts.
        c. ASTM F468 for nonferrous bolts.
        d. ASTM F593 for stainless steel.
    2. Screws: ASME B18.6.1.
    3. Washers: ASTM F436, type to suit material and anchorage.
    4. Nails: ASTM F1667, Type I, style 6 or 14 for finish work.

2.4 FABRICATION GENERAL

A. Material:
    1. Use material as specified. Use material of commercial quality and suitable for intended purpose for material that is not named or its standard of quality not specified.
    2. Use material free of defects which could affect the appearance or service ability of the finished product.

B. Size:
    1. Size and thickness of members as shown.
    2. When size and thickness is not specified or shown for an individual part, use size and thickness not less than that used for the same component on similar standard commercial items or in accordance with established shop methods.

C. Connections:
    1. Except as otherwise specified, connections may be made by welding, riveting or bolting.
    2. Field riveting will not be approved.
    3. Design size, number and placement of fasteners, to develop a joint strength of not less than the design value.
    4. Holes, for rivets and bolts: Accurately punched or drilled and burrs removed.

5. Size and shape welds to develop the full design strength of the parts connected by welds and to transmit imposed stresses without permanent deformation or failure when subject to service loadings.
6. Use Rivets and bolts of material selected to prevent corrosion (electrolysis) at bimetallic contacts. Plated or coated material will not be approved.
7. Use stainless steel connectors for removable members machine screws or bolts.

D. Fasteners and Anchors:
   1. Use methods for fastening or anchoring metal fabrications to building construction as shown or specified.
   2. Where fasteners and anchors are not shown, design the type, size, location and spacing to resist the loads imposed without deformation of the members or causing failure of the anchor or fastener, and suit the sequence of installation.
   3. Use material and finish of the fasteners compatible with the kinds of materials which are fastened together and their location in the finished work.
   4. Fasteners for securing metal fabrications to new construction only, may be by use of threaded or wedge type inserts or by anchors for welding to the metal fabrication for installation before the concrete is placed or as masonry is laid.
   5. Fasteners for securing metal fabrication to existing construction or new construction may be expansion bolts, toggle bolts, power actuated drive pins, welding, self-drilling and tapping screws or bolts.

E. Workmanship:
   1. General:
      a. Fabricate items to design shown.
      b. Furnish members in longest lengths commercially available within the limits shown and specified.
      c. Fabricate straight, true, free from warp and twist, and where applicable square and in same plane.
      d. Provide holes, sinkages and reinforcement shown and required for fasteners and anchorage items.
      e. Provide openings, cut-outs, and tapped holes for attachment and clearances required for work of other trades.
      f. Prepare members for the installation and fitting of hardware.
      g. Cut openings in gratings and floor plates for the passage of ducts, sumps, pipes, conduits and similar items. Provide reinforcement to support cut edges.
      h. Fabricate surfaces and edges free from sharp edges, burrs and projections which may cause injury.

   2. Welding:
      a. Weld in accordance with AWS.
      b. Welds shall show good fusion, be free from cracks and porosity and accomplish secure and rigid joints in proper alignment.
      c. Where exposed in the finished work, continuous weld for the full length of the members joined and have depressed areas filled and protruding welds finished smooth and flush with adjacent surfaces.
      d. Finish welded joints to match finish of adjacent surface.

   3. Joining:
      a. Miter or butt members at corners.
      b. Where frames members are butted at corners, cut leg of frame member perpendicular to surface, as required for clearance.

4. Anchors:
    a. Where metal fabrications are shown to be preset in concrete, weld 32 x 3 mm (1-1/4 by 1/8 inch) steel strap anchors, 150 mm (6 inches) long with 25 mm (one inch) hooked end, to back of member at 600 mm (2 feet) on center, unless otherwise shown.
    b. Where metal fabrications are shown to be built into masonry use 32 x 3 mm (1-1/4 by 1/8 inch) steel strap anchors, 250 mm (10 inches) long with 50 mm (2 inch) hooked end, welded to back of member at 600 mm (2 feet) on center, unless otherwise shown.

5. Cutting and Fitting:
    a. Accurately cut, machine and fit joints, corners, copes, and miters.
    b. Fit removable members to be easily removed.
    c. Design and construct field connections in the most practical place for appearance and ease of installation.
    d. Fit pieces together as required.
    e. Fabricate connections for ease of assembly and disassembly without use of special tools.
    f. Joints firm when assembled.
    g. Conceal joining, fitting and welding on exposed work as far as practical.
    h. Do not show rivets and screws prominently on the exposed face.
    i. The fit of components and the alignment of holes shall eliminate the need to modify component or to use exceptional force in the assembly of item and eliminate the need to use other than common tools.

F. Finish:
1. Finish exposed surfaces in accordance with NAAMM AMP 500 Metal Finishes Manual.
2. Aluminum: NAAMM AMP 501.
    a. Mill finish, AA-M10, as fabricated, use unless specified otherwise.
3. Steel and Iron: NAAMM AMP 504.
    a. Zinc coated (Galvanized): ASTM A123, G90 unless noted otherwise.
4. Stainless Steel: NAAMM AMP-504 Finish No. 4.

G. Protection:
1. Insulate aluminum surfaces that will come in contact with concrete, masonry, plaster, or metals other than stainless steel, zinc or white bronze by giving a coat of heavy-bodied alkali resisting bituminous paint or other approved paint in shop.
2. Spot prime all abraded and damaged areas of zinc coating which expose the bare metal, using zinc rich paint on hot-dip zinc coat items and zinc dust primer on all other zinc coated items.

2.5 SUPPORTS

A. General:
1. Fabricate ASTM A36 structural steel shapes as shown.
2. Use clip angles or make provisions for welding hangers and braces to overhead construction.
3. Field connections may be welded or bolted.

B. For Wall Mounted Items:
1. For items supported by metal stud partitions.
2. Steel strip or hat channel minimum of 1.5 mm (0.0598 inch) thick.
3. Steel strip minimum of 150 mm (6 inches) wide, length extending one stud space beyond end of item supported.
4. Steel hat channels where shown. Flange cut and flatted for anchorage to stud.
5. Structural steel tube or channel for grab bar at water closets floor to structure above with clip angles or end plates formed for anchors.
6. Use steel angles for thru wall counters. Drill angle for fasteners at ends and not over 100 mm (4 inches) on center between ends.

2.6 FRAMES

A. Channel Door Frames:
   1. Fabricate of structural steel channels of size shown.
   2. Miter and weld frames at corners.
   3. Where anchored to masonry or embedded in concrete, weld to back of frame at each jamb, 5 mm (3/16 inch) thick by 44 mm (1-3/4 inch) wide steel strap anchors with ends turned 50 mm (2 inches), and of sufficient length to extend at least 300 mm (12 inches) into wall. Space anchors 600 mm (24 inches) above bottom of frame and 600 mm (24 inches) o.c. to top of jamb. Weld clip angles to bottom of jambs and provide holes for expansion bolts.
   4. Where anchored to concrete or masonry in prepared openings, drill holes at jambs for anchoring with expansion bolts. Weld clip angles to bottom of frame and provide holes for expansion bolt anchors as shown. Drill holes starting 600 mm (24 inches) above bottom of frame and 600 mm (24 inches) o.c. to top of jamb and at top of jamb. Provide pipe spacers at holes welded to channel.
   5. Where closure plates are shown, continuously weld them to the channel flanges.
   6. Weld continuous 19 x 19 x 3 mm (3/4 x 3/4 x 1/8 inch) thick steel angles to the interior side of each channel leg at the head and jambs to form a caulking groove.
   7. Prepare frame for installation of hardware specified in Section 08 71 00, DOOR HARDWARE.
      a. Cut a slot in the lock jamb to receive the lock bolt.
      b. Where shown use continuous solid steel bar stops at perimeter of frame, weld or secure with countersunk machine screws at not more than 450 mm (18 inches) on center.
B. Frames for Breech Opening:
   1. Fabricate from steel channels, or combination of steel plates and angles to size and contour shown.
   2. Weld strap anchors on back of frame at not over 600 mm (2 feet) on centers for concrete or masonry openings.

2.7 GUARDS

A. Wall Corner Guards:
   1. Fabricate from steel angles and furnish with anchors as shown.
   2. Continuously weld anchor to angle.
B. Guard Angles for Overhead Doors:
   1. Cut away top portion of outstanding leg of angle and extend remaining portion of angle up wall.
   2. Weld filler piece across head of opening to jamb angles.
   3. Make provisions for fasteners and anchorage.
C. Channel Guard at Loading Platform:
   1. Fabricate from steel channel of size shown.
   2. Weld anchors to channels as shown.
   3. Drill channel for bumper anchor bolts.
D. Edge Guard Angles for Openings in slabs:
   1. Fabricate from steel angles of sizes and with anchorage shown.
   2. Where size of angle is not shown, provide 50 x 50 x 6 mm (2 x 2 x 1/4 inch) steel angle with 32 x 5 mm (1-1/4 x 3/16 inch) strap anchors, welded to back.
   3. Miter or butt angles at corners and weld.
   4. Use one anchor near end and three feet on centers between end anchors.
E. Wheel Guards:
   1. Construct wheel guards of not less than 16 mm (5/8 inch) thick cast iron.
   2. Provide corner type, with flanges for bolting to walls.

2.8 COVERS AND FRAMES FOR PITS AND TRENCHES

A. Fabricate covers to support live loads specified.
B. Galvanized steel members after fabrication in accordance with ASTM A123, G-90 coating.
C. Steel Covers:
    1. Use 6 mm (1/4 inch) thick floor plate for covers unless otherwise shown. Use gratings where shown as specified in paragraph GRATINGS. Use smooth floor plate unless noted otherwise.
    2. Provide clearance at all sides to permit easy removal of covers.
    3. Make cutouts within 6 mm (1/4 inch) of penetration for passage of pipes and ducts.
    4. Drill covers for flat head countersunk screws.
    5. Make cover sections not to exceed 2.3 m^2 (25 square feet) in area and 90 kg (200 pounds) in weight.
    6. Fabricate trench cover sections not be over 900 mm (3 feet) long and if width of trench is more than 900 mm (3 feet)or over, equip one end of each section with an angle or "T" bar stiffener to support adjoining plate.
    7. Use two, 13 mm (1/2 inch) diameter steel bar flush drop handles for each cover section.
D. Steel Frames:
    1. Form frame from structural steel angles as shown. Where not shown use 63 x 63 x 6 mm (2-1/2 x 2-1/2 x 1/4 inch) angles for frame openings over 1200 mm (4 feet) long and 50 x 50 x 6 mm (2 ix 2 x 1/4 inch) for frame openings less than 1200 mm (4 feet).
    2. Fabricate intermediate supporting members from steel "T's" or angles; located to support cover section edges.
    3. Where covers are required use steel border bars at frames so that top of cover will be flush with frame and finish floor.
    4. Weld steel strap anchors to frame. Space straps not over 600 mm (24 inches) o.c., not shown otherwise between end anchors. Use 6 x 25 x 200 mm (1/4 x 1 x 8 inches) with 50 mm (2 inch) bent ends strap anchors unless shown otherwise.
    5. Drill and tap frames for screw anchors where plate covers occur.

2.9 GRATINGS

A. Fabricate gratings to support live loads specified and a concentrated load as specified.
B. Provide clearance at all sides to permit easy removal of grating.
C. Make cutouts in gratings with 6 mm (1/4 inch) minimum to 25 mm (one inch) maximum clearance for penetrations or passage of pipes and ducts. Edge band cutouts.
D. Fabricate in sections not to exceed 2.3 m^2 (25 square feet) in area and 90 kg (200 pounds) in weight.
E. Fabricate sections of grating with end-banding bars.
F. Fabricate angle frames and supports, including anchorage as shown.
    1. Fabricate intermediate supporting members from "T's" or angles.
    2. Locate intermediate supports to support grating section edges.
    3. Fabricate frame to finish flush with top of grating.
    4. Locate anchors at ends and not over 600 mm (24 inches) o.c.
    5. Butt or miter, and weld angle frame at corners.
G. Steel Bar Gratings:
    1. Fabricate grating using steel bars, frames, supports and other members shown in accordance with Metal Bar Grating Manual.
    2. Galvanize steel members after fabrication in accordance with ASTM A123, G-90 for exterior gratings, gratings in concrete floors, and interior grating where specified.
    3. Interior gratings: Prime paint unless specified galvanized.

2.10 LOOSE LINTELS

A. Furnish lintels of sizes shown. Where size of lintels is not shown, provide the sizes specified.
B. Fabricate lintels with not less than 150 mm (6 inch) bearing at each end for nonbearing masonry walls, and 200 mm (8 inch) bearing at each end for bearing walls.

C. Provide one angle lintel for each 100 mm (4 inches) of masonry thickness as follows except as otherwise specified or shown.
   1. Openings 750 mm to 1800 mm (2-1/2 feet to 6 feet) - 100 x 90 x 8 mm (4 x 3-1/2 x 5/16 inch).
   2. Openings 1800 mm to 3000 mm (6 feet to 10 feet) - 150 x 90 x 9 mm (6 x 3-1/2 x 3/8 inch).
D. For 150 mm (6 inch) thick masonry openings 750 mm to 3000 mm (2-1/2 feet to 10 feet) use one angle 150 x 90 x 9 mm (6 x 3-1/2 x 3/8 inch).
E. Provide bearing plates for lintels where shown.
F. Weld or bolt upstanding legs of double angle lintels together with 19 mm (3/4-inch bolts) spaced at 300 mm (12 inches) on centers.
G. Insert spreaders at bolt points to separate the angles for insertion of metal windows, louver, and other anchorage.
H. Where shown or specified, punch upstanding legs of single lintels to suit size and spacing of anchor bolts.
I. Elevator Entrance:
   1. Fabricate lintel from plate bent to channel shape, and provide a minimum of 100 mm (4 inch) bearing each end.
   2. Cut away the front leg of the channel at each end to allow for concealment behind elevator hoist-way entrance frame.

2.11 SHELF ANGLES

A. Fabricate from steel angles of size shown. Refer to Structural Drawings.
B. Fabricate angles with horizontal slotted holes for 19 mm (3/4 inch) bolts spaced at not over 900 mm (3 feet) on centers and within 300 mm (12 inches) of ends.
C. Provide adjustable malleable iron inserts for embedded in concrete framing.

2.12 PLATE DOOR SILL

A. Fabricate of checkered plate as detailed.
   1. Aluminum Plate: ASTM B632, 3 mm (0.125 inch) thick.
   2. Steel Plate: ASTM A786, 3 mm (0.125 inch thick), galvanized G90.
B. Fabricate for anchorage with flat head countersunk bolts at each end and not over 300 mm (12 inches), o.c.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set work accurately, in alignment and where shown, plumb, level, free of rack and twist, and set parallel or perpendicular as required to line and plane of surface.
B. Items set into concrete or masonry.
   1. Provide temporary bracing for such items until concrete or masonry is set.
   2. Place in accordance with setting drawings and instructions.
   3. Build strap anchors, into masonry as work progresses.
C. Set frames of gratings, covers, corner guards, trap doors and similar items flush with finish floor or wall surface and, where applicable, flush with side of opening.
D. Field weld in accordance with AWS.
   1. Design and finish as specified for shop welding.
   2. Use continuous weld unless specified otherwise.
E. Install anchoring devices and fasteners as shown and as necessary for securing metal fabrications to building construction as specified. Power actuated drive pins may be used except for removable items and where members would be deformed or substrate damaged by their use.
F. Spot prime all abraded and damaged areas of zinc coating as specified and all abraded and damaged areas of shop prime coat with same kind of paint used for shop priming.
G. Isolate aluminum from dissimilar metals and from contact with concrete and masonry materials as required to prevent electrolysis and corrosion.
H. Secure escutcheon plate with set screw.

3.2 INSTALLATION OF SUPPORTS

A. Anchorage to structure.
   1. Secure angles or channels and clips to overhead structural steel by continuous welding unless bolting is shown.
   2. Secure supports to concrete inserts by bolting or continuous welding as shown.
   3. Secure supports to mid height of concrete beams when inserts do not exist with expansion bolts and to slabs, with expansion bolts. unless shown otherwise.
   4. Secure steel plate or hat channels to studs as detailed.
B. Supports for Wall Mounted items:
   1. Locate center of support at anchorage point of supported item.
   2. Locate support at top and bottom of wall hung cabinets.
   3. Locate support at top of floor cabinets and shelving installed against walls.
   4. Locate supports where required for items shown.

3.3 COVERS AND FRAMES FOR PITS AND TRENCHES

A. Set frame and cover flush with finish floor.
B. Secure plates to frame with flat head countersunk screws.
C. Set gratings loose in drainage trenches or over pits unless shown anchored.

3.4 DOOR FRAMES

A. Secure clip angles at bottom of frames to concrete slab with expansion bolts as shown.
B. Level and plumb frame; brace in position required.
C. At masonry, set frames in walls so anchors are built-in as the work progresses unless shown otherwise.
D. Set frames in formwork for frames cast into concrete.
E. Where frames are set in prepared openings, bolt to wall with spacers and expansion bolts.

3.5 OTHER FRAMES

A. Set frame flush with surface unless shown otherwise.
B. Anchor frames at ends and not over 450 mm (18 inches) on centers unless shown otherwise.
C. Set in formwork before concrete is placed.

3.6 GUARDS

A. Steel Angle Corner Guards:
   1. Build into masonry as the work progress.
   2. Set into formwork before concrete is placed.
   3. Set angles flush with edge of opening and finish floor or wall or as shown.
   4. At existing construction fasten angle and filler piece to adjoining construction with 16 mm (5/8 inch) diameter by 75 mm (3 inch) long expansion bolts 450 mm (18 inches) on center.
   5. Install Guard Angles at Edges of // Trench // Stairwell // Openings in Slab // Dock Leveler // Overhead Doors where shown.
B. Channel Guard at Top Edge of Concrete Platforms:
   1. Install in formwork before concrete is placed.
   2. Set channel flush with top of the platform.
C. Wheel Guards:
   1. Set flanges of wheel guard at least 50 mm (2 inches) into pavement.
   2. Anchor to walls as shown, expansion bolt if not shown.

3.7 GRATINGS

A. Set grating flush with finish floor; top of curb, or areaway wall. Set frame so that horizontal leg of angle frame is flush with face of wall except when frame is installed on face of wall.
B. Set frame in formwork before concrete is placed.
C. Where grating terminates at a wall bolt frame to concrete or masonry with expansion bolts unless shown otherwise.
D. Secure removable supporting members in place with stainless steel bolts.
E. Bolt gratings to supports.

3.8 STEEL LINTELS

A. Use lintel sizes and combinations shown or specified.
B. Install lintels with longest leg upstanding, except for openings in 150 mm (6 inch) masonry walls install lintels with longest leg horizontal.
C. Install lintels to have not less than 150 mm (6 inch) bearing at each end for nonbearing walls, and 200 mm (8 inch) bearing at each end for bearing walls.

3.9 SHELF ANGLES

A. Anchor shelf angles with 19 mm (3/4 inch) bolts unless shown otherwise in adjustable malleable iron inserts, set level at elevation shown.
B. Provide expansion space at end of members.

3.10 PLATE DOOR SILL

A. Install after roofing base flashing and counter flashing work is completed.
B. Set in sealant and bolt to curb.

3.14 INSTALLATION OF STEEL PIPE BOLLARD

A. Set bollards vertically in concrete piers. Compressive strength of concrete piers shall be 21MPa 3000psi. For dimensions of concrete piers See standard detail SD320523-04.

3.15 CLEAN AND ADJUSTING

A. Adjust movable parts including hardware to operate as designed without binding or deformation of the members centered in the opening or frame and, where applicable, contact surfaces fit tight and even without forcing or warping the components. Clean after installation exposed prefinished and plated items and items fabricated from stainless steel, aluminum and copper alloys, as recommended by the metal manufacture and protected from damage until completion.

END OF SECTION

SECTION 06 40 23
INTERIOR ARCHITECTURAL WOODWORK

PART 1 GENERAL

1.1 SUMMARY

A. Provide interior finish carpentry, architectural woodwork and countertops.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

C. Samples: Submit two representative samples of each material specified indicating visual characteristics and finish. Include range samples if variation of finish is anticipated.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. Standards: Architectural Woodwork Institute (AWI) 'Architectural Woodwork Standards.'

C. Preservative Treatment: Non-pressure method, exterior type, AWPA N1

D. Fire-Retardant Treatment:
1. Lumber: AWPA C20, non-corrosive type.

E. Wood Products: Comply with the following:
1. Hardwood Plywood and Face Veneers: HPVA HP-1.

F. Mock-Ups: Provide mock-up as required to demonstrate quality of workmanship of each type of finish carpentry.

PART 2 PRODUCTS

2.1 MATERIALS

A. Interior Wood Casework:
1. Species for Opaque Finish: White pine or sugar pine.
2. Grade: Economy.
3. Factory or Site Finish: Opaque finish.

B. Interior Casework Hardware and Auxiliary Materials:
1. Hardware Standard: ANSI/BHMA A156.9.
2. Hardware Finish and Base Metal: Satin stainless steel.

C. Interior Wood Countertops:
1. Countertop: Solid wood board.
2. Grade: Economy.
3. Factory or Site Finish: Opaque finish.

D. Interior Shelving and Closet Specialties:
   1. Manufacturers: Refer to www.arcat.com/divs/sec/sec06200.html
   2. Shelving: Plywood with hardwood edge-band.
   3. Shelving: PVC coated wire shelving system.
   4. Closet Rods: Wood.

E. Interior Auxiliary Materials:
   1. Manufacturers: Refer to www.arcat.com/divs/sec/sec06200.html
   2. Screws: FS FF-S-111.
   3. Nails: FS FF-N-105.
   4. Anchors: Type required for secure anchorage.

PART 3 EXECUTION

3.1 INSTALLATION

A. Provide work to sizes, shapes, and profiles indicated. Install work to comply with quality standards referenced. Back prime work and install plumb, level and straight with tight joints; scribe work to fit.

B. Quality Standard: Install woodwork to comply with AWI standards for the same grade specified for type of woodwork involved.

C. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials and systems in proper relation with adjacent construction. Coordinate with work of other sections.

D. Comply with manufacturer's requirements for cutting, handling, fastening and working treated materials.

E. Repair minor damage, clean and protect.

END OF SECTION

SECTION 07 14 00
FLUID-APPLIED WATERPROOFING

PART 1 GENERAL

1.1 SUMMARY

A. Provide fluid-applied membrane waterproofing.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Warranty: Submit manufacturers standard warranty. Include labor and materials to repair or replace defective materials.
1. Warranty Period: 5 years for polyurethane waterproofing.
2. Warranty Period: 10 years for hot rubberized waterproofing.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. Testing: Flood testing of horizontal applications.

PART 2 PRODUCTS

2.1 MATERIALS

A. Foundation Wall Waterproofing:
1. Manufacturers: Kemper System America, Inc..
2. Type: One-part modified polyurethane-based liquid membrane waterproofing, 90 percent solids, ASTM C 836, 60 mil thick coating.
3. Accessories: Primers, surface conditioners, termination bars, and protection board.

B. Insulating Drainage Panels:
1. Manufacturers: Kemper System America, Inc..
2. Type: Extruded-polystyrene board ASTM C 578; Type IV, 1.6-lb/cu. ft. 25-psi compressive strength; shiplap or tongue-and-groove edges and with drainage channels one side, faced with geotextile fabric.

PART 3 EXECUTION

3.1 INSTALLATION

A. Modified Polyurethane Waterproofing: Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials and systems in proper relation with adjacent construction. Coordinate with work of other sections.

B. Restore damaged components and test waterproofing. Clean and protect work from damage.

END OF SECTION

SECTION 07 46 23
CEDAR SIDING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Exterior Fencing.

1.2 RELATED SECTIONS

A. Section 32 31 19 Decorative Fences And Gates

1.3 REFERENCES

A. Western Red Cedar Lumber Association (WRCLA): Publications.
   1. How to Finish Western Red Cedar.

B. National Lumber Grades Authority (NLGA):
   1. Standard Grading Rules.

C. West Coast Lumber Inspection Bureau (WCLIB):
   1. Standard Grading Rules.

D. Western Wood Products Association (WWPA):
   1. Western Lumber Grading Rules.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00.

B. Verification Samples: For each finish product specified, three samples, nominal size 5-1/2 inches (140 mm) square representing actual product with finished color and texture.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Must have 5 years' experience installing cedar siding of the types and sizes identified in this specification.
   1. Licensed, registered, or otherwise approved to install cedar siding by authorities having jurisdiction over the Project location.

B. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Inspect the materials upon delivery to assure that specified products have been received.

B. Store materials in safe area, away from construction traffic; store under cover and off ground, protected from moisture.

C. Keep materials clearly separated and identified with grade marks legible. Keep damaged material identified as damaged and stored separately.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 SUPPLEMENTAL MATERIALS

A. Fasteners, Supports, and Hangers: Provided by manufacturers other than member organizations of the WRCLA. Conform to requirements set forth by this section.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
   1. Jarmak Reclaimed Wood,
   2. Longleaf Lumber,
   3. Ark Reclaimed Wood,
   4. Urban Miners,
   5. New England ReUse.

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

2.2 EXTERIOR FENCING

A. Clear Cedar Fencing:
   1. Western Red Cedar Graded to Meet any one of the following:
      a. NLGA "Standard Grading Rules," paragraph 200.
      b. WCLIB "Grading Riles," paragraph 102.
      c. WWPA "Western Lumber Grading Rules," paragraph 20.10.
   2. Moisture Content: Kiln-dried.
   3. Grade: “A” Clear and Better.
   4. Surface: Surfaced four sides (S4S).
   5. Finish: Site stained.

2.3 FASTENERS

A. Nails:
   1. Material: No. 304 stainless steel.
   2. Material: No. 316 stainless steel.
   3. Type: Splitless siding nails.
   4. Type: Spiral shank.
   5. Length: Sufficient to penetrate solid wood a minimum of 1-1/4 inch (32 mm).

2.4 PROTECTING FINISH

A. Refer to Section 09 91 00 Painting – Commercial Exterior Systems

B. Adhere to coating manufacturer's instructions.

PART 3 EXECUTION

3.1 EXAMINATION

A. Coordinate work with related trades. Allow installation of related work to avoid cutting and patching.

B. Do not begin installation until substrates have been properly constructed and prepared.

C. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Scribe and cope siding boards for accurate fit.

D. Select siding boards of longest possible lengths. Discard boards that are warped, twisted, bowed, crooked or otherwise defective.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.
   1. Install products according to Western Red Cedar Lumber Association installation guidelines and with adherence to local building codes and regulations where the Project is located.
   2. Follow installation instructions specified in the Western Red Cedar Lumber Association's Installing Cedar Siding publication.

B. Finish materials on all sides and ends. Apply touch up coating on new cuts.
   1. Factory primed or finishing is preferred.

3.4 FIELD QUALITY CONTROL

A. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

3.5 CLEANING AND PROTECTION

A. As work proceeds, maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris related to this work.

B. Clean cedar siding in accordance with the manufacturer's recommendations.

C. Touch-up, repair or replace damaged products before Substantial Completion.

3.6 MAINTENANCE

A. Explain proper maintenance procedures to owner or owner's representative at project closeout.

B. Visually inspect siding, caulking, flashing annually for overall condition. Re-apply caulking and coating, as necessary. Adjust flashing as required.

C. The use of pressure washers is not recommended.

END OF SECTION

SECTION 07 92 00
JOINT SEALANTS

PART 1 GENERAL

1.1 SUMMARY

A. Provide joint sealers and fillers.

1.2 SUBMITTALS

A. Product Data and Samples: Submit manufacturer's product data and installation instructions for each material and product used. Submit two representative samples of each material specified indicating visual characteristics and finish. Include range samples if variation of finish is anticipated. Include manufacturers full range of color and finish options if additional selection is required.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions. Provide field-constructed mock-ups of each joint type.

PART 2 PRODUCTS

2.1 MATERIALS

A. Exterior Joints in Vertical Surfaces:
1. Manufacturers: GE Silicones.
2. Materials: Two component silicone sealant.

B. Exterior Paving Joint Fillers, Bituminous:
1. Manufacturers: Refer to www.arcat.com/divs/sec/sec07900.html
2. Materials: Bituminous fiber.

C. Interior Joints, Sanitary Silicone:
1. Manufacturers: GE Silicones.
2. Materials: One-part mildew-resistant silicone sealant, ASTM C 920.

PART 3 EXECUTION

3.1 INSTALLATION

A. Beginning work means acceptance of substrates.

B. Provide sealants in colors as selected from manufacturer's standards for Architect’s approval. Install materials and systems in accordance with manufacturer's instructions and approved submittals and in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections. Clean and prime joints, and install bond breakers, backer rods and sealant as recommended by manufacturers.

C. Depth shall equal width up to 1/2 inch wide; depth shall equal 1/2 width for joints over 1/2 inch wide. Cure and protect sealants as directed by manufacturers. Replace or restore damaged sealants. Clean adjacent surfaces to remove spillage.

END OF SECTION

SECTION 08 11 10
STEEL DOORS AND FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Steel doors and steel frames.

1.2 RELATED SECTIONS

A. Section 09 90 00 - Painting and Coating.

B. Section 28 16 00 - Intrusion Detection.

1.3 REFERENCES

A. ANSI/NFPA 80 - Standard for Fire Doors and Windows.

B. ANSI A115.IG - Installation Guide for Doors and Hardware

C. ANSI A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames.

D. ANSI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.

E. ANSI A250.11, Recommended Erection Instructions for Steel Frames.

F. ASTM E 152 - Standard Methods of Fire Tests of Door Assemblies.

G. ASTM A 366/A 366M - Standard Specification for Commercial Steel (CS) Sheet, Carbon, (0.15 Maximum Percent) Cold-Rolled.

H. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-coated (Galvannealed) by the Hot-Dip Process.

I. A 924 - Specification for General Requirements for Steel Sheet, Metallic Coated by the Hot Dip Process

J. ASTM A 1008/A 1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable

K. NFPA 252 - Standard Methods of Fire Tests for Door Assemblies.

L. UL 10B - Standard for Fire Tests of Door Assemblies.

M. UL 10C - Positive Pressure Fire Tests of Door Assemblies.

N. UL 63 - Outline of Investigation for Fire Door Frames

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

C. Shop Drawings: Include schedule identifying each unit, with door marks or numbers referencing drawings. Show layout, profiles, product components and anchorages.
1. Indicate frame configuration, anchor types and spacing, location of cutouts for hardware, reinforcement, to ensure doors and frames are properly prepared and coordinated to receive hardware.
2. Indicate door elevations, internal reinforcement, closure method, and cutouts for glass lights and louvers.

D. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum five years documented experience manufacturing products specified this Section.

B. Installer Qualifications: Minimum five years documented experience installing products specified this Section.

C. All products shall conform to the requirements of ANSI A250.8 Recommended Specifications for Standard Steel Doors and Frames".

D. Fire Rated Doors and Frames:
1. Doors and frames shall be tested in accordance with UL 10B, "Fire Tests of Door Assemblies", NFPA 252, "Fire Tests of Door Assemblies", and UL 10C, "Positive Pressure Fire Tests of Door Assemblies".
2. Doors and frames must have an approved marking or physical label, applied by an authorized facility, in accordance with the procedure set forth by an independent certification agency.
3. Fire door assemblies in exit enclosures and exit passageways; maximum transmitted temperature end point rating of not more than 250 degrees F (121 degrees C) above ambient at the end of 30 minutes of the standard fire test exposure.
4. Conform to applicable codes for fire ratings. It is the intent of this specification that hardware and its application comply or exceed the standards for labeled openings. In case of conflict between types required for fire protection, furnish type required by NFPA and UL.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store doors vertically in a dry area, under a proper vented cover. Place on 4 inch (102 mm) high wood sills to prevent rust or damage. Provide 1/4-inch (6 mm) space between doors to promote air circulation.

C. Store frames in an upright position with heads uppermost under cover. Place on 4 inch (102 mm) high wood sills to prevent rust and damage. Store assembled frames five units maximum in a stack with 2 inch (51 mm) space between frames to promote air circulation.

D. Do not use non-vented plastic or canvas shelters to prevent rust or damage.

E. Should wrappers become wet, remove immediately.

1.7 SEQUENCING

A. Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.

B. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.8 COORDINATION

A. Coordinate Work with other directly affected sections involving manufacture or fabrication of internal cutouts and reinforcement for door hardware, electric devices and recessed items.

B. Coordinate Work with frame opening construction, door and hardware installation.

C. Sequence installation to accommodate required door hardware.

D. Verify field dimensions for factory assembled frames prior to fabrication.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Galaxy Metal Products, or equal.

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

C. Provide all steel doors and frames from a single manufacturer.

2.2 DOORS

A. General: Construct exterior/interior doors to the following designs and gages:
   1. Exterior Doors: Zinc-Iron Alloy-Coated galvannealed steel, ASTM A 653, Class A60:
      a. Thickness: 16 gage (1.3 mm).
      b. Include galvannealed components and internal reinforcements with galvannealed doors.
      c. Close tops of exterior swing-out doors to eliminate moisture penetration. Galvannealed steel top caps are permitted.
   2. Interior Doors: Cold-rolled steel, ASTM A 1008/A 1008M:
      a. Thickness: 16 gage (1.3 mm).
   3. Include galvannealed components and internal reinforcements.
   4. Prime Finish Doors: Clean, phosphatize and factory prime painted doors indicated on Door Schedule as HM.
   5. Glass moldings and stops:
      a. Fabricate from 24 gage (0.5 mm) steel conforming to:
         1) Interior openings ASTM designation A 366 cold rolled steel.
         2) Exterior openings ASTM designation A 924 Zinc-Iron Alloy-Coated galvannealed steel with a zinc coating of 0.06 ounces per square foot (A60) for exterior openings.
      b. Install trim into the door as a four-sided welded assembly with mitered, reinforced and welded corners.
      c. Trim: identical on both sides of the door.
      d. Exposed fasteners are not permitted.
      e. Labeled and non-labeled doors: use the same trim.
      f. Acceptable mounting methods:
         1) Fit into a formed area of the door face, not extending beyond the door

face, and interlocking into the recessed area
2) Cap the cutout not extend more than 1/16 inch (1.6 mm) from the door face.

6. Hardware Reinforcements:
   a. Hinge reinforcements for full mortise hinges: minimum 7 gage (4.76 mm).
   b. Lock reinforcements: minimum 16 gage (1.3 mm).
   c. Closer reinforcements: minimum 14 gage (1.7 mm) steel, 20-inch (508 mm) long.
   d. Galvannealed doors: include galvannealed hardware reinforcements.
   e. Projection welded hinge and lock reinforcements to the edge of the door.
   f. Provided adequate reinforcements for other hardware as required.

B. Full Flush Doors:
1. Door Thickness: 1-3/4 inches (45 mm).
2. Door faces reinforced and sound deadened as follows:
   a. Honeycomb Core: Reinforced, stiffened, sound deadened and insulated with impregnated Kraft honeycomb core completely filling the inside of the doors and laminated to inside faces of both panels using contact adhesive applied to both panels and honeycomb core.
   b. Steel Stiffened Core: Vertical stiffeners, hat-shaped, minimum 20 gage (0.8 mm) steel, type same as face sheet material, spaced 6 inches (150 mm) apart and welded to inside of face sheets 5 inches (127 mm) on center; full-thick glass fiber insulation between stiffeners.
3. Vertical edge seams: Provide doors with continuous vertical mechanical inter-locking joints at lock and hinge edges. Finish edges as follows:
   a. Visible Interlocked Edge: Continuous vertical mechanical interlocking joints with visible edge seams and continuous bead of structural epoxy in internal vertical connection
   b. Filled Vertical Edges (F): Continuous vertical mechanical interlocking joints with internal epoxy seal; edge seams epoxy filled and ground smooth.
   c. Welded Vertical Edges (W): Continuous vertical mechanical interlocking joints; edge seams welded, epoxy filled, and ground smooth.
4. Bevel hinge and lock door edges 1/8 inch (3 mm) in 2 inches (50 mm). Square edges on hinge and/or lock stiles are not acceptable.
5. Reinforce top and bottom of doors with galvannealed 14 gage (1.7 mm), welded to both panels.
6. Glazing Bead: Formed steel sheet.
7. Fire Rating: Supply door units bearing Labels for fire ratings indicated in Door Schedule for the locations indicated.

2.3 DOOR FRAMES

A. General: Construct exterior/interior metal door frames to the following designs and gages;
1. Exterior Frames: Zinc-Iron Alloy-Coated galvannealed steel, ASTM A 653, Class A60:
   a. Thickness:
      1) 16 gage (1.3 mm).
2. Interior Frames in Masonry: Zinc-Iron Alloy-Coated galvannealed steel, ASTM A 653, Class A60, galvannealed steel.
   a. Thickness:
      1) 16 gage (1.3 mm).
3. Interior Frames in stud wall construction: cold rolled steel, ASTM A 1008/A 1008M.
   a. Thickness:
      1) 16 gage (1.3 mm).
4. Interior KD Drywall Frames (Pressure Fit): cold rolled steel, ASTM A 1008/A 1008M.
   a. Thickness:
      1) 16 gage (1.3 mm).

5. Include galvannealed components and internal reinforcements with galvannealed frames.
6. Electrical Requirements: Coordinate all electrical requirements for doors and frames. Make provisions for installation of electrical items so that wiring can be readily removed and replaced.
    a. Provide cutouts and reinforcements required for metal door frame to accept electric components.
    b. Frame with Electrical Hinges: Weld UL listed grout guard cover box welded over center hinge reinforcing. Top or bottom hinge locations are not permitted.
    c. Provide cutouts and reinforcements required to accept security system components.

B. Flush Steel Frames:
1. Construction: Three-piece knock-down frames; mitered joints, with locking tab at each head and jamb intersection.
2. Construction: Factory-welded three-sided frames in accordance with UL 63.
    a. Face welded: Weld miter joints between head and jamb faces completely along their length either internally or externally. The remaining elements of the frame profile (soffit, stop and rabbets) are not welded. Grind and finish face joints smooth.
    b. Full profile welded:
        1) Weld miter joints between head and jamb faces completely along their length either internally or externally.
        2) Internally weld perimeter profile joints full length of soffit and rabbets with hairline seams on external meeting surfaces. Grind and finish face joints smooth.
3. Profile:
    a. 2 inches (51 mm) face dimension with 5/8 inch (16 mm) high stop, and types and throat dimensions indicated on the Door Schedule.
    b. 1 inch (25 mm) face dimension with 5/8 inch (16 mm) high stop, and types and throat dimensions indicated on the Door Schedule.
    c. Custom special face dimension with 5/8 inch (16 mm) high stop, and types and throat dimensions indicated on the Door Schedule.
4. Provide following reinforcement and accessories:
    a. Hinge Preparation for 4-1/2 inches (114 mm) high, standard weight, or heavy weight, full mortise hinges; with plaster guard.
    b. Hinge Preparation for 5 inch (127 mm) high, universal standard weight, or heavy weight, full mortise hinges; with plaster guard.
    c. Strike preparation (single doors) for 4-7/8 inch (123 mm) universal strike; with plaster guard.
    d. Silencers. Prepare frames to receive inserted type door silencers, 3 per strike jamb on single doors, and 2 per head for pair of doors. Stick-on silencers are not permitted.
5. Fire Rating: Supply frame units bearing Labels for fire ratings indicated in Door Schedule for the locations indicated.
6. Finish: Factory prime finish in accordance with ANSI A 250.10.

C. Steel Frames for Drywall:
1. Profile:
    a. Profile: 2 inches (51 mm) face dimension, 1/2 inch (13 mm) backbend with 5/16 inch (8 mm) return, 5/8 inch (16 mm) high stop, types and throat dimensions indicated.
2. Provide following reinforcement and accessories:
    a. Hinge preparation for 4-1/2 inches (114 mm) high, full mortise hinges, 0.134 inch (3.4 mm) or 0.180 inch (4.6 mm) leaf thickness.
    b. Strike preparation (single doors) for 4-7/8 inch (125 mm) universal strike; with

plaster guard.
c. Closer reinforcement: minimum 14 gage (1.7 mm) steel.
d. Projection weld hinge and strike reinforcements to the door frame.
e. Provide metal plaster guards for all mortised cutouts.
f. Include galvannealed hardware reinforcements in all galvannealed frames.
g. Silencers. Prepare frames to receive inserted type door silencers, 3 per strike jamb on single doors, and 2 per head for pair of doors. Stick-on silencers are not permitted.

3. Anchors: Locate adjustable anchors in each jamb 4 inches (102 mm) from the top of the door opening to hold frame in rigid alignment.
a. Provide 14 ga. pressure anchors used in conjunction with base floor clips as required.
4. Fire Rating: Supply frame units bearing Labels for fire ratings indicated in Door Schedule for the locations indicated.
5. Finish: Factory prime finish.

2.4 ACCESSORIES

A. Anchors: Manufacturer's standard framing anchors, specified in manufacturer's printed installation instructions for project conditions.

B. Astragals for pairs of doors: Manufacturer's standard for labeled and non-labeled openings.

C. Plaster Guards: Same material as door frame, minimum 24 gage (0.5 mm) minimum; provide for all strike boxes.

D. Silencers: Resilient rubber, Inserted type, three per strike jamb for single openings and two per head for paired openings. Stick-on silencers shall not be permitted except on hollow metal framing systems.

E. Glazing: Specified in Section 08 83 13 - Mirrored Glass Glazing.

F. Door Louvers:
1. Inserted: 1 inch (25 mm) thick, inverted "Y" blade type, inserted into an opening prepared in the door faces. Blades are made from 18 gage (1.0 mm) steel and welded to a fabricated sub-frame. Louver is held in place by a retaining frame (shroud), supplied with louver.
a. Free air space is 50 percent of louver area.
b. Size: As indicated on the Drawings.
c. Frame: with tamper proof fasteners.

2.5 FABRICATION

A. Steel Frames:
1. Three-piece knock-down frames: Head and jamb intersecting corners die-cut, mitered at 45 degrees, with locking tabs for rigid connection when assembled.
2. Factory-welded frames: Head and jamb intersecting corners mitered at 45 degrees, with back welded joints ground smooth.
a. Continuous face-weld the joint between the head and jamb faces along their length either internally or externally. Grind, prime paint, and finish smooth face joints with no visible face seams.
b. Externally weld, grind, prime paint, and finish smooth face joints at meeting mullions or between mullions and other frame members per a current copy of ANSI A250.8.
c. Provide temporary steel spreaders (welded to the jambs at each rabbet of door openings) on welded frames during shipment. Remove temporary steel spreaders prior to installation of the frame.

3. Provide cutouts and reinforcements required for electrical and security components specified elsewhere in this specification.

2.6 FINISHES

A. Chemical Treatment: Treat steel surfaces to promote paint adhesion.

B. Factory Prime Finish: Meet requirements of ANSI A250.10.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Verify that substrate conditions are acceptable for installation of doors and frames in accordance with manufacturer's installation instructions and technical bulletins.

C. Verify door frame openings are installed plumb, true, and level.

D. Select fasteners of adequate type, number, and quality to perform intended functions.

E. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install frames plumb, level, rigid and in true alignment in accordance with ANSI A250.11, "Recommended Erection Instructions for Steel Frames" and ANSI A115.IG, "Installation Guide for Doors and Hardware".

C. All frames other than slip-on types shall be fastened to the adjacent structure to retain their position and stability. Drywall slip-on frames shall be installed in prepared wall openings, and shall use pressure type and sill anchors to maintain stability.

D. Where grouting is required in masonry installations, frames shall be braced or fastened to prevent the pressure of the grout from deforming the frame members. Grout shall be mixed to provide a 4 inch (102 mm) maximum slump and hand troweled into place. Grout mixed to a thin "pumpable" consistency shall not be used.

E. Install fire-rated doors and frames in accordance with NFPA 80 and local code authority requirements.

F. Install doors to maintain alignment with frames to achieve maximum operational effectiveness and appearance. Adjust to maintain perimeter clearances as required. Shim as needed to assure the proper clearances are achieved.

G. Glaze and seal exterior transom, sidelight and window frames in accordance with HMMA-820 TN03.

H. Install hardware as specified in Section 08 71 53 - Security Door Hardware in accordance with the hardware manufacturer's recommendations and templates. ANSI A115.IG, "Installation Guide for Doors and Hardware" shall be consulted for other pertinent information.

3.4 CLEARANCES

A. Clearance between the door and frame head and jambs for both single swing and pairs of doors shall be 1/8 inch (3.2 mm).

B. Clearance between the meeting edges of pairs of doors shall be 3/16 inch plus or minus 1/16 inch (5 mm plus or minus 1.6 mm). For fire rated applications, the clearance between the meeting edges of pairs of doors shall be 1/8 inch plus or minus 1/16 inch (3.2 mm plus or minus 1.6 mm).

C. Bottom clearance shall be 3/4 inch (19 mm) (Standard).

D. The clearance between the face of the door and door stop shall be 1/16 inch to 1/8 inch (1.6 mm plus or minus 3.2 mm).

E. All clearances shall be, unless otherwise specified, subject to a tolerance of plus or minus 1/32 inch (.4 mm).

3.5 ADJUSTING AND CLEANING

A. Adjust doors for free swing without binding.

B. Adjust hinge sets, locksets, and other hardware. Lubricate using a suitable lubricant compatible with door and frame coatings.

C. Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions before owner's acceptance.

D. Remove from project site and legally dispose of construction debris associated with this work.

3.6 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 08330
ROLLING SERVICE DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Rolling service doors.

1.2 RELATED SECTIONS

A. Section 05500 - Metal Fabrications: Support framing and framed opening.

B. Section 08710 - Door Hardware: Product Requirements for cylinder core and keys.

C. Section 26050 - Common Work Results For Electrical

1.3 REFERENCES

A. ANSI/DASMA 108 - American National Standards Institute Standard Method For Testing Sectional Garage Doors And Rolling Doors: Determination Of Structural Performance Under Uniform Static Air Pressure Difference.

B. NFRC 102 - Test Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems.

C. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Element.

D. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

E. ASTM A 653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

F. ASTM A 666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

G. ASTM A 924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

H. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

1.4 DESIGN / PERFORMANCE REQUIREMENTS

A. Single-Source Responsibility: Provide doors, tracks, motors, and accessories from one manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc. acceptable to authority having jurisdiction as suitable for purpose specified.

1.5 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Details of construction and fabrication.
   4. Installation instructions.

B. Shop Drawings: Include detailed plans, elevations, details of framing members, anchoring methods, required clearances, hardware, and accessories. Include relationship with adjacent construction. Submit under Section 01300.

C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

D. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

E. Operation and Maintenance Data: Submit lubrication requirements and frequency, and periodic adjustments required.

F. Warranty: 24-month limited on door, 3 year/20,000 cycles limited on door & operator system (when purchased together).

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in performing Work of this section with a minimum of five-years experience in the fabrication and installation of security closures.

B. Installer Qualifications: Installer Qualifications: Company specializing in performing Work of this section with minimum three years and approved by manufacturer.

C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   1. Finish areas designated by Architect.
   2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
   3. Refinish mock-up area as required to produce acceptable work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Protect materials from exposure to moisture. Do not deliver until after wet work is complete and dry.

C. Store materials in a dry, warm, ventilated weathertight location.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.9 COORDINATION

A. Coordinate Work with other operations and installation of adjacent materials to avoid damage to installed materials.

1.10 WARRANTY

A. Warranty: Manufacturer's limited door and operator system, except the counterbalance spring and finish, to be free from defects in materials and workmanship for 3 years or 20,000 cycles, whichever occurs first.

B. Warranty: Manufacturer's limited door system warranty for 2 years for all parts and components.

C. PowderGuard Finish
   1. PowderGuard Max: Applied to curtain, guides, bottom bar, headplates: Manufacturer's limited Max Finish warranty for 5-years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: "Overhead Door Corporation", or equal.

B. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 ROLLING SERVICE DOORS

A. Industrial Doors: Overhead Door Corporation, Model 610 Rolling Service Doors:
   1. Curtain: Interlocking roll-formed slats as specified following - 16 ga. galvanized steel. End-locks shall be attached to each end of alternate slats to prevent lateral movement.
   2. Finish: Gray
   3. Hood: 24 ga. galvanized steel
   4. Standard mounting: Face of wall
   5. Weather-seals: Bottom bar astragal
   6. Guides: Three structural steel angles w/ PowderGuard weathered finish & black powder coat.
   7. Bottom bar: Extruded aluminum with weatherseal up to 15'-4".
   8. Lock: Pad-lockable chain keeper on chain hoist.
   9. Brackets: Galvanized steel to support counterbalance, curtain and hood.
   10. Counterbalance: Helical torsion spring type housed in a steel tube or pipe barrel, supporting the curtain with deflection limited to 0.03 inch per foot of span. Counterbalance is adjustable by means of an adjusting tension wheel.
   11. Manual Operation:
      a. Manual push up for doors up to 96 SF.
      b. Chain hoist for doors up to 96 SF.
      c. Chain hoist for doors over 96 SF.
      d. Crank operation.
   12. Wind Load Design:
      a. Standard wind load shall be 20 PSF.
   13. Operation: Design door assembly, including operator, to operate for not less than 20,000 cycles.
   14. Locking: Chain keeper locks for chain hoist operation.

15. Wall Mounting Condition: Face-of-wall mounting, AND between jambs mounting.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify opening sizes, tolerances and conditions are acceptable. Examine conditions of substrates, supports, and other conditions under which this work is to be performed.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions. Instruct Owner’s personnel in proper operating procedures and maintenance schedule.

B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.

C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.

D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.

E. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 07900.

F. Install perimeter trim and closures.

3.4 ADJUSTING

A. Test for proper operation and adjust as necessary to provide proper operation without binding or distortion.

B. Adjust hardware and operating assemblies for smooth and noiseless operation.

3.5 CLEANING AND PROTECTION

A. Clean curtain and components using non-abrasive materials and methods recommended by manufacturer. Remove labels and visible markings. Touch-up, repair or replace damaged products before Substantial Completion. Protect installed products until completion of project.

END OF SECTION

SECTION 08 51 13
ALUMINUM WINDOWS

PART 1 GENERAL

1.1 SUMMARY

A. Provide aluminum windows.

1.2 SUBMITTALS

A. Product Data and Shop Drawings: Submit manufacturer's product data and installation instructions for each material and product used. Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

B. Color Samples: Submit two representative samples of each material specified indicating visual characteristics and finish. Include range samples if variation of finish is anticipated.

C. Warranty and Maintenance Data: Submit manufacturer's standard warranty. Include labor and materials to repair or replace defective materials. Period is 5-years. Submit manufacturer's maintenance data, including maintenance schedule.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. Performance: Comply with AAMA/NWWDA 101/I.S.2, Grade 55 of required window.

PART 2 PRODUCTS

2.1 MATERIALS

A. Aluminum Windows:
1. Manufacturer: Kawneer, or equal, thermal-break type, clear single pane glass, clear anodized aluminum frame finish, horizontal sliding windows, with Insect screening.
2. Aluminum Window Members: Aluminum extrusions.
3. Anchors, Clips, and Window Accessories: Aluminum.

PART 3 EXECUTION

3.1 INSTALLATION

A. Fabricate windows to conform to AAMA standards and accept glass specified.

B. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials and systems in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections. Restore damaged finishes and test for proper operation. Clean and protect work from damage.

C. Operation: Provide locking units with manual operation.

END OF SECTION

SECTION 08 71 00
DOOR HARDWARE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Door hardware for doors specified in "Hardware Sets" and required by actual conditions. Include screws, bolts, expansion shields, electrified door hardware, and other devices for proper application of hardware.

1.2 RELATED DIVISIONS

A. Section 081110: Steel Doors And Frames

1.3 REFERENCES

A. American National Standards Institute/Builders Hardware Manufacturers Association (ANSI):
   1. ANSI/BHMA A156.1 Butts & Hinges (2006).
   2. ANSI/BHMA A156.2 Bored & Preassembled Locks & Latches (2011).
   3. ANSI/BHMA A156.3 Exit Devices (2008).
   4. ANSI/BHMA A156.4 Door Controls - Closers (2008).
   5. ANSI/BHMA A156.5 Cylinders and Input Devices for Locks (2010).
   6. ANSI/BHMA A156.6 Architectural Door Trim (2010).
   7. ANSI/BHMA A156.7 Template Hinge Dimensions (2009).
   8. ANSI/BHMA A156.8 Door Controls - Overhead Stops and Holders (2010).
   9. ANSI/BHMA A156.12 Interconnected Locks & Latches (2005).
   10. ANSI/BHMA A156.13 Mortise Locks & Latches (2005).
   11. ANSI/BHMA A156.15 Closer Holder Release Devices (2011).
   12. ANSI/BHMA A156.16 Auxiliary Hardware (2008).
   13. ANSI/BHMA A156.18 Materials & Finishes (2006).
   14. ANSI/BHMA A156.21 Thresholds (2009).
   15. ANSI/BHMA A156.22 Door Gasketing Systems (2012).
   16. ANSI/BHMA A156.28 Keying Systems (2007).
   17. ANSI/BHMA A156.30 High Security Cylinders (2007).
   18. ANSI/BHMA A156.32 Integrated Door Assemblies (2008).
   19. ANSI/BHMA A156.36 Auxiliary Locks (2010).
   20. ANSI/BHMA A156.115 Hardware Preparation in Steel Doors and Steel Frames (2006).

B. International Code Council/American National Standards Institute (ICC/ANSI)/ADA:
   1. ICC/ANSI A117.1 Standards for Accessible and Usable Buildings and Facilities 2003.
   2. ICC/ANSI A117.1 Standards for Accessible and Usable Buildings and Facilities 2009.
   3. Americans with Disabilities Act Accessibility Guidelines (ADAAG).

C. Underwriters Laboratories, Inc. (UL):
   1. UL 10C Positive Pressure Fire Test of Door Assemblies.
   2. UL 1784 Air Leakage Test of Door Assemblies.
   3. UL/ULC Listed.

D. Door and Hardware Institute (DHI):
   1. DHI Publication - Keying Systems and Nomenclature (1989).
   2. DHI Publication - Abbreviations and Symbols.
   3. DHI Publication - Installation Guide for Doors and Hardware.
   4. DHI Publication - Sequence and Format of Hardware Schedule (1996).

E. National Fire Protection Agency (NFPA)
   1. NFPA 80 Standard for Fire Doors and Other Opening Protective's, latest edition.
   2. NFPA 101 Life Safety Code, latest edition.
   3. NFPA 105 Standard for the Installation of Smoke Door Assemblies, latest edition.

F. Building Codes
   1. IBC International Building Code, latest edition.
   2. Rhode Island State Building Code, latest edition.

1.4 SUBMITTALS

A. Submit in accordance with Conditions of the Contract and provisions of Section 01 30 00 - Administrative Requirements.

B. Shop Drawings: Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of hardware.

C. Submit manufacturer's catalog sheet on design, grade and function of items listed in hardware schedule. Identify specific hardware item per sheet, provide index, and cover sheet.

D. Coordination: Distribute door hardware templates to related divisions within fourteen days of receiving approved door hardware submittals.

1.5 QUALITY ASSURANCE

A. Door hardware shall conform to ICC/ANSI A117.1. Handles, Pulls, Latches, Locks and operating devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.

B. Fire Rated Door Assemblies: Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL 10C, unless otherwise indicated.

C. Fire Door Inspection: Prior to receiving certificate of occupancy have fire rated doors inspected by an independent certified Fire and Egress Door Assembly Inspector (FDAI), as certified by Intertek (ITS), a written report shall be submitted to Owner and Contractor. Doors failing inspection shall be adjusted, replaced or modified to be within appropriate code requirements.

D. Door hardware shall be certified to ANSI/BHMA standards as noted, participate and be listed in BHMA Certified Products Directory.

E. Within fourteen days of receipt of approved door hardware submittals contact Owner with representative from hardware supplier to establish a keying conference. Verify keyway, visual key identification, number of master keys and keys per lock. Provide keying system per Owners instructions.

F. Installer Qualifications: Specialized in performing installation of this Section and shall have five years minimum documented experience.

1.6 DELIVERY, STORAGE AND HANDLING

A. Provide a clean, dry and secure room for hardware delivered to Project but not yet installed.

B. Furnish hardware with each unit marked and numbered in accordance with approved finish hardware schedule. Include door and item number for each type of hardware.

C. Pack each item complete with necessary parts and fasteners in manufacturer's original packaging.

D. Deliver permanent key, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to Owner shall be established at "Keying Conference."

E. Waste Management and Disposal: Separate waste materials for reuse or recycling in accordance with Division 1.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.8 WARRANTY

A. General Warranty: Owner may have under provisions of the Contract Documents and shall be in addition to and run concurrent with other warranties made by Contractor under requirements of the Contract documents.

B. Special Warranty: Warranties specified in this article shall not deprive Owner of other rights. Contractor, hardware supplier, and hardware installer shall be responsible for servicing hardware and keying related problems.
   1. Ten years for manual door closers.
   2. Five years for mortise, auxiliary and bored locks.
   3. Five years for exit devices.
   4. Two years for electromechanical door hardware.

C. Products judged defective during warranty period shall be replaced or repaired in accordance with manufacturer's warranty at no cost to Owner. There is no warranty against defects due to improper installation, abuse and failure to exercise normal maintenance.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer’s: Emtek Solutions, Baldwin, and Omnia Industries.

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 HINGES

A. Hinges, including electric hinges and self-closing hinges when scheduled, shall be of one manufacturer as listed for continuity of design and consideration of warranty and shall be certified and listed by the following:
   1. Butts and Hinges: ANSI/BHMA A156.1
   2. Template Hinge Dimensions: ANSI/BHMA A156.7
   3. Self-Closing Hinges: ANSI/BHMA 156.17

B. Butt Hinges:
   1. Hinge weight and size unless otherwise indicated in hardware sets:
      a. Doors up to 36 inches (914 mm) wide and up to 1-3/4 inches (44.5 mm) thick provide hinges with a minimum thickness of .134 inch (3.4 mm) and a minimum of 4-1/2 inches (114 mm) in height.
      b. Doors from 36 inches (914 mm) wide up to 42 inches (1067 mm) wide and up to 1-3/4 inches (44.5 mm) thick provide hinges with a minimum thickness of .145 inch (3.7 mm) and a minimum of 4-1/2 inches (114 mm) in height.
      c. For doors from 42 inches (1067 mm) wide up to 48 inches (1219 mm) wide and up to 1-3/4 inches (44.5 mm) thick provide hinges with a minimum thickness of .180 inch (4.6 mm) and a minimum of 5 inches (127 mm) in height.
      d. Doors greater than 1-3/4 inches (44.5 mm) thick provide hinges with a minimum thickness of 0.180 inch (4.6 mm) and a minimum of 5 inches (127 mm) in height.
      e. Width of hinge is to be minimum required to clear surrounding trim.
   2. Base material unless otherwise indicated in hardware sets:
      a. Exterior Doors: 304 Stainless Steel, Brass or Bronze material.
      b. Interior Doors: Steel material.
      c. Fire Rated Doors: Steel or 304 Stainless Steel materials.
      d. Stainless Steel ball bearing hinges shall have stainless steel ball bearings. Steel ball bearings are unacceptable.
   3. Quantity of hinges per door unless otherwise stated in hardware sets:
      a. Doors up to 60 inches (1524 mm) in height provide 2 hinges.
      b. Doors 60 inches (1524 mm) up to 90 inches (2286 mm) in height provide 3 hinges.
      c. Doors 90 inches (2286 mm) up to 120 inches (3048 mm) in height provide 4 hinges.
      d. Doors over 120 inches (3048 mm) in height add 1 additional hinge per each additional 30 inches (762 mm) in height.
      e. Dutch doors provide 4 hinges.
   4. Hinge design and options unless otherwise indicated in hardware sets:
      a. Hinges are to be of a square corner five-knuckle design, flat button tips and have ball bearings unless otherwise indicated in hardware sets.
      b. Out-swinging exterior and out-swinging access-controlled doors shall have non-removable pins (NRP) to prevent removal of pin while door is in closed position.
      c. When full width of opening is required, use hinges that are designed to swing door completely from opening when door is opened to 95 degrees.
      d. Provide mortar boxes for frames that require any electrically modified hinges if not an integral part of frame.
      e. When shims are necessary to correct frame or door irregularities, provide metal shims only.

2.3 LOCKS AND LATCHES (GRADE 1 MORTISE)

A. Locks and latches shall be of one manufacturer as listed for continuity of design and consideration of warranty. Product to be certified and listed by following:
   1. ANSI/BHMA A156.13 Series 1000 Certified to Grade 1 for Operational and Security.
   2. UL/cUL Labeled and listed up to 3 hours for single doors up to 48 inches (1219 mm) in width and up to 96 inches (2438 mm) in height.
   3. UL10C/UBC 7-2 Positive Pressure Rated.
   4. ICC/ANSI A117.1.

B. Lock and latch function numbers and descriptions of manufacturer's series as listed in hardware sets. Material and Design:
   1. Lock cases from fully wrapped, 12-gauge steel, Zinc dichromate for corrosion resistance.
   2. Non-handed, field reversible without opening lock case.
   3. Break away spindles to prevent unlocking during forced entry or vandalism.
   4. Levers are to be Zinc cast, Forged Brass or Stainless Steel and plated to match finish designation in hardware sets.
   5. Sectional Roses are to be of solid Brass or Stainless-Steel material and have a minimum diameter of 2-7/16 inches (62 mm).
   6. Escutcheons are to be of solid Brass or Stainless-Steel material.
   7. Armor fronts are to be self-adjusting to accommodate a square edge door or a standard 1/8 inch (3 mm) beveled edge door.

C. Latch and Strike:
   1. Stainless Steel latch bolt with minimum of 3/4 inch (19 mm) throw and deadlocking for keyed and exterior functions.
   2. Strike is to fit a standard ANSI A115 prep measuring 1-1/4 inches (32 mm) by 4-7/8 inches (124 mm) with proper lip length to protect surrounding trim.
   3. Deadbolts to be 1-3/4 inches (44.5 mm) total length with a minimum of a 1 inch (25 mm) throw and 3/4 inch (19 mm) internal engagement when fully extended and made of Stainless-Steel material.
   4. Doors requiring lead line protection provide locks with 1/16-inch (1.5 mm) lead applied to lock and 1/16-inch (1.5 mm) lead wrapped around latch bolt.
   5. Provide knurled levers on entry side of doors that are potentially dangerous to visually impaired persons.

2.4 CYLINDERS AND KEYING

A. Cylinders shall be of one manufacturer as listed for continuity of design and consideration of warranty.

B. Standards: Manufacturer shall meet the following:
   1. Auxiliary Locks: ANSI/BHMA A156.5
   2. DHI Handbook "Keying systems and nomenclature" (1989)

C. Cylinders:
   1. Manufacturer's standard tumbler type, seven-pin IC core and seven-pin conventional core.
   2. Shall be furnished with cams/tailpieces as required for locking device that is being furnished for project.

D. Keying:
   1. Copy of Owners approved keying schedule shall be submitted to Owner and Architect with documentation of which keying conference was held and Owners sign-off.
   2. Provide a bitting list to Owner of combinations as established, and expand to twenty five percent for future use or as directed by Owner.
   3. Key into Owner's existing keying system if applicable.
   4. Keys to be shipped to Owner's representative, individually tag per keying conference.
   5. Provide visual key control identification on keys.
   6. Provide interchangeable cores with construction cores as required per hardware schedule.
   7. Single seven-pin key shall operate both conventional cores and SFIC small format interchangeable cores.

2.5 PUSH/PULL PLATES AND BARS

A. Push and pull plates shall be of one manufacturer as listed for continuity of design and consideration of warranty. Manufacturer to be certified by the following:
   1. Architectural Door Trim: ANSI/BHMA A156.6.
   2. Americans with Disabilities Act Accessibility Guidelines (ADAAG).

B. Push plates: .050 inch (1.3 mm) thick, square corner and beveled edges with counter sunk screw holes. Width and height as stated in hardware sets.

C. Pull plates: .050 inch (1.3 mm) thick, square corner and beveled edges. Width and height as stated in hardware sets, 3/4-inch (19 mm) diameter pull, with clearance of 2-1/2 inches (64 mm) from face of door.

D. Push Pull Bar Sets: 1 inch (25 mm) round bar stock with 2-1/2 inches (64 mm) clearances from face of door. Offset to be 3 inches (76 mm), 90-degree standard. Center to center size should be door width less 1 stile width.

2.6 CLOSERS (CAST IRON BODY GRADE 1)

A. Shall be product of one manufacturer. Unless otherwise indicated on hardware schedule, comply with manufacturer's recommendation for size of closer, depending on width of door, frequency of use, atmospheric pressure, ADAAG requirements, and fire rating. Manufacturer to be certified and or listed by the following:
   1. BHMA Certified ANSI A156.4 Grade 1.
   2. ADA Compliant ANSI A117.1.
   3. UL/cUL Listed up to 3 hours.
   4. UL10C Positive Pressure Rated.
   5. UL10B Neutral Pressure Rated.

B. Material and Design:
   1. Provide cast iron non-handed bodies with full plastic covers.
   2. Closers shall have separate staked adjustable valve screws for latch speed, sweep speed, and backcheck.
   3. Provide Tri-Pack arms and brackets for regular arm, top jamb, and parallel arm mounting.
   4. One-piece seamless steel spring tube sealed in hydraulic fluid.
   5. Double heat-treated steel tempered springs.
   6. Precision-machined heat-treated steel piston.
   7. Triple heat-treated steel spindle.
   8. Full rack and pinion operation.

C. Mounting:
   1. Out swing doors shall have surface parallel arm mount closers except where noted on hardware schedule.
   2. In swing doors shall have surface regular arm mount closers except where noted on hardware schedule.
   3. Provide brackets and shoe supports for aluminum doors and frames to mount fifth screw.
   4. Furnish drop plates where top rail conditions on door do not allow for mounting of closer and where backside of closer is exposed through glass.

D. Size closers in compliance with requirements for accessibility (ADDAG). Comply with following maximum opening force requirements. Interior hinged openings: 5.0 lb. (2.25 Kg) Fire rated and exterior openings shall have minimum opening force allowable by authority having jurisdiction.

E. Fasteners: Provide self-reaming and self-tapping wood and machine screws and sex nuts and bolts for each closer.

2.7 PROTECTIVE TRIM

A. Size of protection plate: Single doors, size two inches (51 mm) less door width (LDW) on push side of door, and one inch (25 mm) less on pull side of door. For pairs of doors, size one inch less (25 mm) door width (LDW) on push side of door, and 1/2 inch (13 mm) on pull side of door. Kick plates 10 inches (254 mm) high or sized to door bottom rail height. Mop Plates 4 inches (102 mm) high. Armor Plates 36 inches (914 mm) high. Manufacturer shall meet requirements for:
   1. Architectural Door Trim: ANSI/BHMA A156.6.
   2. UL.

B. Material and Design:
   1. .050-inch (1.3 mm) gage stainless steel.
   2. Corners shall be square. Polishing lines or dominant direction of surface pattern shall run across the door width of plate.
   3. Bevel top, bottom and sides uniformly leaving no sharp edges. Edges shall be de-burred.
   4. Countersink holes for screws. Screws holes shall be spaced equidistant eight inches (203 mm) CTC, along a centerline not over 1/2 inch (13 mm) in from edge around plate. End screws shall be a maximum of 0.53 inch (1.35 mm) from corners.

C. UL label stamp required on protection plates when top of plate is more than 16 inches (406 mm) above bottom of door on fire rated openings. Verify door manufacturers UL listing for maximum height and width of protection plate to be used.

2.8 STOPS AND HOLDERS

A. Wall Stops: Provide door stops wherever necessary to prevent door or hardware from striking an adjacent partition or obstruction. Provide wall stops when possible. Door stops and holders mounted in concrete floor or masonry walls shall have stainless steel machine screws and lead expansion shields. Manufacturer shall meet requirements for Auxiliary Hardware: ANSI/BHMA A156.16.

B. Overhead Stops and Holders: Provide overhead stop and holders for doors that open against equipment, casework sidelights and other objects that would make wall stops/holders and floor stops/holders inappropriate. Provide sex bolt attachments for mineral core wood door applications.

C. Standards: Manufacturer shall be certified by the following: Overhead Stops and Holders: ANSI/BHMA A156.8 Grade 1.

2.9 DOOR GASKETING AND WEATHERSTRIP

A. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing where indicated on hardware schedule. Provide non-corrosive fasteners for exterior applications.
   1. Perimeter gasketing: Apply to head and jamb, forming seal between door and frame.
   2. Meeting stile gasketing: Fasten to meeting stiles, forming seal when doors are in closed position.
   3. Door bottoms: Apply to bottom of door, forming seal with threshold or floor when door is in closed position.
   4. Sound Gasketing: Cutting or notching for stop mounted hardware not permitted.
   5. Drip Guard: Apply to exterior face of frame header. Lip length to extend 4 inches (102 mm) beyond width of door.

B. Standards: Manufacturer shall meet requirements for:
   1. Door Gasketing and Edge Seal Systems: ANSI/BHMA A156.22.
   2. Shall be BHMA certified for door sweeps, automatic door bottoms, and adhesive applied gasketing. (721).

C. Smoke-Labeled Gasketing: Comply with NFPA 105 listed, labeled, and acceptable to authorities having jurisdiction, for smoke control indicated. Provide smoke labeled gasketing on 20-minute rated doors and on smoke rated doors.

D. Fire-Rated Gasketing: Comply with NFPA 80 listed, labeled, and acceptable to Authorities Having Jurisdiction, for fire ratings indicated.

E. Refer to Wood Doors specification for Category A or Category B. Comply with UBC 7-2 and UL10C positive pressure where frame applied intumescent seals are required. Provide Hager # 720 for single and 720 by 724 for a pair of doors.

2.10 THRESHOLDS

A. Set thresholds for exterior and acoustical openings in full bed of sealant with lead expansion shields and stainless steel machine screws complying with requirements specified in Division 7 Section "Joint Sealants". Notched in field to fit frame by hardware installer. Refer to Drawings for special details. Manufacturer to be certified by the following:
   1. Thresholds: ANSI/BHMA A156.21.
   2. Americans with Disabilities Act Accessibility Guidelines (ADAAG).

2.11 SILENCERS

A. Where smoke, light, or weather seal are not required, provide three silencers per single door frame, two per double door frame and four per Dutch door frame. Manufacturer shall meet requirements for: Auxiliary Hardware: ANSI/BHMA A156.16.

2.12 KEY CABINET

A. Provide key cabinet, surface mounted to wall. Key control system: Include two sets of key tags, hooks, labels, and envelopes. Contain system in metal cabinet with baked enamel finish. Capacity shall be able to hold actual quantities of keys, plus 25 percent. Provide tools, instruction sheets and accessories required to complete installation.

B. Acceptable Manufacturer:
   1. Lund Equipment.
   2. Telkey Incorporated.
   3. Key Control.

2.13 SIGNAGE

A. Shall be of one manufacturer as listed for continuity of design and consideration of warranty. Manufacturer shall meet requirements for: Signage: ANSI/BHMA A156.16. Grade 2 Braille Translation conforming to section 4.3 requirements.

B. Materials and Design: Provide 0.125 inch (3 mm) thick plastic. Size of sign to be 6 inches by 8 inches (152 mm by 203 mm) fastened with double-sided pressure sensitive tape.

2.14 FINISHES

A. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if within range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within range of approved Samples.

B. Comply with base material and finish requirements indicated by ANSI/BHMA A156.18 designations in hardware schedule.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install hardware per manufacturer's instructions and in compliance with the following as applicable:
   1. NFPA 80; NFPA 105; ICC/ANSI A117.1; ANSI/BHMA A156.115 Hardware Preparation in Steel Doors and Steel Frames; UL10C/UBC7-2; Local building code.
   2. Approved shop drawings.
   3. Approved finish hardware schedule.

B. Do not install surface mounted items until finishes have been completed on substrates involved. Set unit level, plumb and true to line location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.

3.3 ADJUSTMENT, CLEANING AND DEMONSTRATING

A. Adjustment: Adjust and check each opening to ensure proper operation of each item of finish hardware. Replace items that cannot be adjusted to operate freely and smoothly or as intended for application at no cost to Owner.

B. Cleaning: Clean adjacent surfaces soiled by hardware installation. Clean finished hardware per manufacturer's instructions after final adjustments has been made. Replace items that cannot be cleaned to manufacturer's level of finish quality at no cost to Owner.

3.4 PROTECTION

A. Leave manufacturer's protective film intact and provide proper protection for all other finish hardware items that do not have protective material from the manufacture until Owner accepts Project as complete.

B. Provide door hardware required to make each set complete and operational.

C. Hardware schedule does not reflect handing, backset, method of fastening and like characteristics of door hardware and door operation.

D. Review door hardware sets with door types, frames, sizes and details on drawings. Verify suitability and adaptability of items specified in relation to details and surrounding conditions.

END OF SECTION

SECTION 09330
CERAMIC TILE

PART 1 – GENERAL

A. Tile work shall be designed and specified in accordance with the current edition of the “Handbook for Ceramic Tile Installation” of the Tile Council of America” (TCA).

B. When patching tile in existing areas, develop a pattern rather than merely replacing required tile.

C. Preferred tile sizes for toilet room walls are 3” x 6” maximum size only.

PART 2 - PRODUCTS

A. Products shall comply with ANSI Standard A137.1, “American Standard Specifications for Ceramic Tile”. Tile shall be “Standard Grade”. Standard is Dal-Tile, Classic Color Wheel Collection, Arctic White Subway Tile.

B. Do not mix manufacturers. It is preferred that all tile for a project be from one manufacturer.

C. Unglazed ceramic mosaic tile shall be porcelain type, plain face with eased edge, factory mounted, ¼” thick nom.

D. Glazed wall tile shall be bright or matte face, 3/8” thick, flat plain face with cushion edge.

E. Trim units shall match characteristics of field tile. Bases shall be straight type; edges shall be bullnose.

F. Setting materials, grouts and sealants shall be appropriate for the installation method.

G. Provide cement board for tile substrate at all wet location partitions.

PART 3 - EXECUTION

A. Installation shall be in accordance with Tile Council of America Standards (TCA).

B. Specify the setting method for each type tile and location by reference to TCA standards. Generally, all tile installations shall be thin set except sloped floors and shower floors where mud set shall be used.

C. Coordinate and detail expansion joints with building details.

D. Where not supplied on a backing material, tile shall be placed with metal grid template. Do not use spacer buttons on tile edges. Tile joints shall be 1/8” in width.

E. Joint between floor and wall tile shall be caulked with urethane, not grouted.

F. Grout shall be sealed by Contractor and surface protected until acceptance.

G. Provide a maintenance materials list. Extra stock consisting of one (1) box of each color and type of tile used in the project shall be provided.

END OF SECTION

SECTION 09 91 00
PAINTING – COMMERCIAL EXTERIOR SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Commercial exterior painting systems.
   1. New wood.
   2. New wood or properly prepared weathered wood.
   3. Previously stained surfaces.
   4. Previously stained, painted, or sealed wood.
   5. Weathered wood.

1.2 RELATED SECTIONS - EXTERIOR

A. Division 7 - Wood Fencing.

1.3 REFERENCES

A. American National Standards Institute (ANSI) - Performance Standards.

B. Asthma and Allergy Foundation of America and Allergy Standards, Ltd.
   1. The Certified Asthma and Allergy Friendly Mark. A registered certification mark.

C. American Society for Testing Materials (ASTM) - Testing Methods.

D. Cradle to Cradle Products Innovation Institute.
   1. Cradle to Cradle Certification.

E. Environmental Protection Agency; Electronic Code of Federal Regulations (CFR):
   1. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

F. Green Seal Standards (GS-11):
   1. GS-11; May 20, 1993.

G. National Paint and Coatings Association (NPCA) - Gloss Standard.

H. Occupational Safety and Health Act (OSHA) - Safety Standards.

I. Ozone Transmission Commission (OTC) - Established levels of Volatile Organic Compounds.

J. US Green Building Council, (USGBC) - Green Seal standards for LEED paint credits.

1.4 DEFINITIONS

A. Commercial as used in this Section refers to a product well suited for a commercial application.

B. LEED as used in this Section, refers to Leadership in Energy and Environmental Design. Products listed meet LEED criteria for environmentally safe interior primers, paints, and coatings.

C. Premium as used in this Section refers to the best quality product "top of the line".

D. VOC as used in this Section refers to Volatile Organic Compounds found in primers, paints, sealers, and stains. The level of VOCs appears after each product listed in the Schedule in grams per liter (g/L).

E. Paints are available in a wide range of sheens or glosses, as measured by a gloss meter from a 60 and/or 85-degree angle from vertical, as a percentage of the amount of light that is reflected. The following terms are used to describe the gloss of our products. The list below is provided for general guidance; refer to the technical data sheet for the actual gloss/sheen level for each product.
   1. Flat - Less than 5 Percent.
   2. Eggshell - 5 - 20 Percent.
   3. Satin - 20 - 35 Percent.
   4. Semi-Gloss - 30 - 65 Percent.
   5. Gloss - Over 65 Percent.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. LEED Certification Product Data:
   1. Submittals Required:
      a. EQc4.2 Low Emitting Materials - Paint (VOC Certification Letter).

C. Product Data: Provide a complete list of all products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category.
   2. Cross-reference to specified paint system(s) that the product is to be used in; include description of each system.

D. Samples: Submit three paper samples, 5 inches by 7 inches (127mm x 178mm) in size, illustrating selected colors for each color and system selected with specified coats cascaded.

E. Manufacturer's Instructions: Indicate special surface preparation procedures.

F. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of ten years' experience.

B. Installer Qualifications: All products listed in this section are to be applied by a Painting Contractor with a minimum of five years demonstrated experience in surface preparation and field application of the same type and scope as specified.

C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   1. Mock-up areas designated by Architect.
   2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
   3. Approved mock-up areas will serve as the standard for remaining Work.
   4. Refinish mock-up area as required to produce acceptable Work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

C. Disposal:
   1. Never pour leftover coating down any sink or drain. Use up material on the job or seal can and store safely for future use.
   2. Do not incinerate closed containers.
   3. For specific disposal or recycle guidelines, contact the local waste management agency or district. Recycle whenever possible.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.9 WARRANTY

A. Inspection of all surfaces to be coated must be done by the manufacturer's representative to insure proper preparation prior to application. All thinners, fillers, primers, and finish coatings shall be from the same manufacturer to support a product warranty. Products other than those submitted shall be accompanied by a letter stating its fitness for use and compatibility.

B. At project closeout, provide to the Owner or owner's representative an executed copy of the Manufacturer's standard form outlining the terms and conditions of and any exclusions to their Limited Warranty against Manufacturing Defect.

1.10 EXTRA MATERIALS

A. At project closeout, supply the Owner or owner's representative one gallon of each product for touch-up purposes. Cans shall be clearly marked with color name, number, and type of paint.

B. At project closeout, provide the color mixture name and code to the Owner or owner's representative for accurate future color matching.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Benjamin Moore & Co. or equal.

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 MATERIALS - GENERAL

A. Volatile Organic Compound (VOC) Content:
   1. Provide coatings that comply with the most stringent requirements specified in the following:
      a. 40 CFR 59, Subpart D-National Volatile Organic Compound Emission Standards for Architectural Coatings.
      b. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
         1) All references to (0 g/L) are Zero VOCs according to EPA Method 24.

B. Compatibility: Provide materials that are compatible with one another, and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

2.3 MIXING AND TINTING

A. Except where specifically noted in this section, all paint shall be ready-mixed and pre-tinted. Agitate all paint prior to and during application to ensure uniform color, gloss, and consistency.

B. A thinner addition shall not exceed the manufacturer's printed recommendations. Do not use kerosene or other organic solvents to thin water-based paints.

C. Where paint is to be sprayed, thin according to manufacturer's current guidelines.

2.4 COMMERCIAL EXTERIOR PAINT SYSTEMS

A. Exterior – Reclaimed Cedar Siding:
   1. Stain:
      a. Alkyd/ Linseed Oil Option- Semi- Transparent:
         1) Cleaner: Benjamin Moore Restore Wood Restorer N316.
         2) First Coat: Benjamin Moore Arborcoat Exterior Oil Stain Semi Transparent 328/C328 (503 g/L, 229 g/L), MPI No. 13, 33.
         3) Second Coat: Benjamin Moore Arborcoat Exterior Oil Stain Semi Transparent 328/C328 (503 g/L, 229 g/L), MPI No. 13, 33.

PART 3 EXECUTION

3.1 EXAMINATION

A. The Contractor shall review the product manufacturer's special instructions for surface preparation, application, temperature, re-coat times, and product limitations.

B. The Contractor shall review product health and safety precautions listed by the manufacturer.

C. The Contractor shall be responsible for enforcing on site health and safety requirements associated with the Work.

D. Do not begin installation until the substrates have been properly prepared.

E. Ensure that surfaces to receive paint are dry immediately prior to application.

F. Ensure that moisture-retaining substrates to receive paint have moisture content within tolerances allowed by coating manufacturer. Where exceeding the following values, promptly notify Architect and obtain direction before beginning work.
   1. Exterior Wood: 17 percent.

G. Examine surfaces to receive coatings for surface imperfections and contaminants that could impair performance or appearance of coatings, including but not limited to, loose primer, rust, scale, oil, grease, mildew, algae, or fungus, stains or marks, cracks, indentations, or abrasions.

H. Correct conditions that could impair performance or appearance of coatings in accordance with specified surface preparation procedures before proceeding with coating application.

3.2 PREPARATION - GENERAL

A. Clean surfaces thoroughly prior to coating application.

B. Do not start work until surfaces to be finished are in proper condition to produce finished surfaces of uniform, satisfactory appearance.

C. Stains and Marks: Remove completely, if possible, using materials and methods recommended by coating manufacturer; cover stains and marks which cannot be completely removed with isolating primer or sealer recommended by coating manufacturer to prevent bleed-through.

D. Remove Mildew, Algae, and Fungus using materials and methods recommended by coating manufacturer.

E. Remove dust and loose particulate matter from surfaces to receive coatings immediately prior to coating application.

F. Remove or protect adjacent hardware, fence posts, electrical equipment plates, mechanical grilles and louvers, lighting fixture trim, and other items not indicated to receive coatings.

G. Move or protect equipment and fixtures adjacent to surfaces indicated to receive coatings to allow application of coatings.

H. Protect adjacent surfaces not indicated to receive coatings.

I. Prepare surfaces in accordance with manufacturer's instructions for specified coatings and indicated materials, using only methods and materials recommended by coating manufacturer.

3.3 SURFACE PREPARATION

A. Existing Coatings:
   1. Remove surface irregularities by scraping or sanding to produce uniform substrate for coating application; apply one coat primer of type recommended by coating manufacturer for maximum coating adhesion.
   2. If presence of lead in existing coatings is suspected, cease surface preparation, and notify Architect immediately.

B. Wood:
   1. Seal knots, pitch streaks, and sap areas with sealer recommended by coating manufacturer; fill nail recesses and cracks with filler recommended by coating manufacturer; sand surfaces smooth.
   2. Remove mill marks and ink stamped grade marks.
   3. Apply primer coat to back of wood trim and paneling.

3.4 APPLICATION - GENERAL

A. Application of primers, paints, stains, or coatings, by the Contractor, will serve as acceptance that surfaces were properly prepared in accordance with the manufacturer's recommendation.

B. Apply each coat to uniform coating thickness in accordance with manufacturer's instructions, not exceeding manufacturer's specified maximum spread rate for indicated surface; thins, brush marks, roller marks, orange-peel, or other application imperfections are not permitted.

C. Allow manufacturer's specified drying time, and ensure correct coating adhesion, for each coat before applying next coat.

D. Inspect each coat before applying the next coat; touch-up surface imperfections with coating material, feathering, and sanding if required; touch-up areas to achieve flat, uniform surface without surface defects visible from 5 feet (1.5 m).

E. Remove dust and other foreign materials from substrate immediately prior to applying each coat.

F. Where paint application abuts other materials or other coating color, terminate coating with a clean sharp termination line without coating overlap.

G. Where color changes occur between adjoining spaces, through framed openings that are of same color as adjoining surfaces, change color at outside stop corner nearest to face of closed door.

H. Re-prepare and re-coat unsatisfactory finishes; refinish entire area to corners or other natural terminations.

3.5 CLEANING

A. Clean excess coating materials, and coating materials deposited on surfaces not indicated to receive coatings, as construction activities of this section progress; do not allow to dry.

B. Re-install hardware, electrical equipment plates, mechanical grilles and louvers, lighting fixture trim, and other items that have been removed to protect from contact with coatings.

C. Reconnect equipment adjacent to surfaces indicated to receive coatings.

D. Relocate to original position equipment and fixtures that have been moved to allow application of coatings.

E. Remove protective materials.

3.6 PROTECTION AND REPAIR

A. Protect completed coating applications from damage by subsequent construction activities until completion of painting project.

B. Touch-up coatings damaged by subsequent construction activities.

END OF SECTION

SECTION 10 14 00
SIGNAGE

PART 1 GENERAL

1.1 SUMMARY

A. Provide signage.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

C. Samples: Submit two representative samples of each material specified indicating visual characteristics and finish. Include range samples if variation of finish is anticipated.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 MATERIALS

A. Interior Signage:
1. Manufacturers: Gemini Inc., or equal.
2. Type: Unframed.
3. Material: Aluminum.
4. Copy: Engraved lettering.

B. Exterior Panel Signs, Post Mounted:
1. Type: Framed single-sheet panels.
2. Copy: Cutout.
3. Material: Aluminum, anodized.
4. Post: Galvanized steel posts.
5. Mounting: Permanent direct-burial.
6. Illumination: External illumination.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials and systems in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections.

B. Restore damaged finishes. Clean and protect work from damage.

END OF SECTION

SECTION 10 44 16
FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.

B. Product Schedule: For fire extinguishers. Coordinate final fire extinguisher schedule with fire protection cabinet schedule to ensure proper fit and function.

1.3 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to the Rhode Island Fire Department.

1.6 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fails in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure of hydrostatic test according to NFPA 10.
b. Faulty operation of valves or release levers.

2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each fire protection cabinet and mounting bracket indicated.

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

a. J. L. Industries, Inc.; a division of Activar Construction Products Group.
b. Larsen's Manufacturing Company.
c. Potter Roemer LLC.

2. Valves: Manufacturer's standard.
3. Handles and Levers: Manufacturer's standard.
4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging.

B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 2-A:10-B:C, 5-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

2.2 MOUNTING BRACKETS

A. Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or black baked-enamel finish.

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

a. J. L. Industries, Inc.; a division of Activar Construction Products Group.
b. Larsen's Manufacturing Company.
c. Potter Roemer LLC.

B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

a. Orientation: Vertical.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.

B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 10 44 16

SECTION 13 12 30
GREENHOUSE SPECIFICATIONS (ALL ALUMINUM CONSTRUCTION)

PART 1 - GENERAL

1.01 GENERAL

A. It is the intent of this portion of the specifications to include the furnishing and erecting of the greenhouse superstructure including all glazing, doors, door hardware, and ventilation as shown on plans and/ or hereinafter described, such work to be the responsibility of the Greenhouse Contractor.

B. It is not the intent of this portion of the specifications to cover concrete, grouting, masonry work of any description, plumbing, electrical work, either power supply or control wiring, nor utility connections. This portion shall be the responsibility of the General Contractor or his selected Sub-contractors other than Greenhouse Contractor.

1.02 SPECIFICATIONS, PLANS AND DRAWINGS

A. The work shall be executed in strict conformity with the plans, drawings, and specifications, and the Greenhouse Contractor shall do no work without proper drawings and instructions. These specifications are intended to supplement the drawings and, therefore, it shall not be their province to mention any portion of the construction which the drawings are competent to explain and such omissions shall not relieve the Greenhouse Contractor from carrying out such portions indicated only on the drawings and should items be require by specifications which are not indicated on the drawings, they shall be supplied and installed by this contractor.

B. The Greenhouse contractor is expected and requested to examine the drawings and specifications, the written portion as well as the printed, including addenda, if there be any, as each word will be held in full force. No failure on his part to understand the drawings and specifications nor to discover any work noted on them or shown thereon or therein will justify a claim for omission of said work from the Contract, or for any extra charge therefore.

C. Before fabricating any material, the Greenhouse Contractor shall submit complete shop drawings and details to the Engineer and Architect for his or her approval. No field work of any kind required for the greenhouse installation shall be performed by any Contractor until greenhouse plans have been reviewed and approved.

D. Plans and calculations shall be signed and sealed by a licensed engineer in the state of installation.

1.03 MANUFACTURE

A. Drawings and specifications are based on all aluminum, clear span truss, "SL Series" Greenhouses of Ludy Greenhouse Mfg., Corp., New Madison, Ohio 45346. Contractor or Sub contractor using materials of the other manufacturer, for such materials, shall furnish evidence satisfactory to the Architect that his product is at least equal to that of Ludy Greenhouse Mfg., and approval shall be obtained from the Architect before such substitution shall be made.

1.04 ERECTION

A. The greenhouses shall be erected by the greenhouse manufacturer or by an experienced erector approved in writing by the manufacturer. The Greenhouse Contractor shall be responsible for the coordination of the concrete work and other work in connection with the greenhouses, but not a portion of this section of the Specifications, so that the work shall proceed in a normal sequence without unnecessary delays.

PART 2 - MATERIAL

2.01 MATERIALS

A. The intent of this specification is that all materials shall be the best of their respective kinds and grades.

B. Glass - All glass shall be 1/8" or 5/32" Clear tempered, depending on width and location, as manufactured by AFG, LOF of Pittsburgh Plate. All cut lites to be annealed glass.

C. Glazing Compounds - All glazing compounds used for the bedding of glass shall be of the extruded butyl glazing compound with continuous built in shim manufactured and delivered to the job in the original containers with seals unbroken. The glass shall be sealed on the outside with a bead of gun grade butyl glazing compound throughout its entire length before applying aluminum glazing caps to the bar. Glass laps may be sealed with a bead of clear silicone if desired.

D. Acrylic Double Skinned Sheet - All acrylics shall be either 8mm or 16mm Exolite No Drip as manufactured by Cyro Industries or equal.

E. POLYCARBONATE Double Skinned Sheet - All polycarbonate double skinned sheet shall be 8mm.

F. Glazing Gaskets - All glazing gaskets shall be EPDM rubber or other compatible material used in conjunction with the above mentioned double skinned sheets and compatible with the glazing material.

G. Aluminum - Aluminum members shall be mill finish extruded with appropriate heat treatment. All extrusions shall have a high inherent resistance to corrosion with a top rating of "A" in corrosion resistance. No castings shall be permitted for joining members at joints subject to stress in which tensile strength is a factor.

H. The various aluminum extrusions shall be of the shapes shown on plans.

I. Alloys - Sheet aluminum shall be of alloy 3003-H14. Extruded aluminum shapes shall be of alloy 6063-T6, or 6063-T5. Members shall be designed to carry the following loads:

2.02 ALLOWABLE STRESS

A. Materials shall carry the following design loads:

1. Dead load
2. Live load -- 10 lbs per sq. ft. minimum on horizontal areas

3. Wind load -- 10 lbs. per sq. ft. minimum on vertically projected areas
4. Load carrying capacities shall be increased where necessary due to higher local snow or wind loads

B. In designing for the above loads, the loads may be considered to act in any of the following combinations:

1. Dead load plus live load
2. Dead load plus wind load plus 1/2 live load
3. Dead load plus wind load
4. Dead load plus live load plus 1/2 wind load

C. **All structures shall be designed to requirements of state/local building codes and will be reviewed and certified by the structural engineer for conformance.**

D. Greenhouse structure(s) shall be designed in accordance with current AISI specifications for design of cold - formed steel structural members and AISC specifications for structural steel buildings. Greenhouse structure(s) shall include sufficient bracing for the resistance to wind forces. Bottom chord members as well as other truss members shall be adequate to resist compressive loads produced by horizontal wind loads and roof uplift produced by wind.

2.03 ALUMINUM FRAME

A. As all members will be visible, it is the intent of the specifications and plans that the design be uniform and adhere to a set pattern; frame spacing shall be 12' 0" on centers. Connections shall be made with stainless steel bolts and extruded aluminum plates. All field connections shall be bolted. Special care shall be taken in the fabrication of this aluminum work, and tolerances shall be held to an absolute minimum in order to secure proper fit of the aluminum members specified and to eliminate the necessity of cutting glazing material.

B. Posts - Aluminum Posts shall be furnished and placed through the length of the greenhouses and across all partitions and gables as indicated on drawings. Posts shall be properly punched of drilled to receive the fittings for attaching the aluminum sills, purlins, gutters, rafters, ect., as the case may be.

C. Truss side posts shall extend in each case from the eave of the structure to below walk level as indicated on plan. Side posts shall be spaced 12' 0" on centers and shall be of the size and shape indicated on the drawings.

D. Posts for gables and cross partitions shall be channels as indicated on the drawings. They shall extend from below grade as shown on the drawings to the rafters, to which they shall be attached with stainless steel bolts.

E. Rafters - Aluminum rafters of the size indicated on plans shall be furnished and placed in the roof of the greenhouse, extending from the eave to the ridge. Each pair of rafters shall be connected together at the ridge by means of aluminum plates.

F. Trusses - Where trusses occur, the rafters described above shall be the top chord of the truss. All other truss members and connecting plates shall be aluminum extrusions of the size and shape indicated on the plans.

G. Truss Supports - Trusses for eave bar shall be connected at the side post by an extruded aluminum plats so designed as to be bolted to the web of the side post with all bolts in shear and to bolt to the rafter and bottom chord in a concentricity loaded joint. If gutter is used trusses shall be connected at the gutter post by an extruded aluminum plate so designed to be bolted to the web of the side post with all bolts in shear or to utilize a "T" Lug to adjoin the flange of the side post and extruded aluminum plate with all bolts in shear while keeping the rafter and bottom chord in a concentricity loaded joint.

H. Purlins - Aluminum purlins in the roof, gables and partitions of the size shown on the plans shall be placed as indicated and connected supporting members with a minimum of two stainless steel bolts into each member connected to. Purlins shall be prefabricated before shipment for the attachment of glazing bars and connecting lugs.

I. Miscellaneous - All other structural members not enumerated above, but required to complete the aluminum framework of the greenhouse in accordance with best standard practice, shall be furnished and placed by the Contractor.

2.04 EAVE BAR

A. Extruded aluminum eave bar shall be provided where shown on plan. This member shall have a flange to receive glazing bars and shall be provided with weep holes to carry condensation collected from the underside of the roof to the outside of the greenhouse. The eave plate can be adapted to receive a continuous hinge element which will allow the installation of out-swinging sash. Joints of this eave plate to occur at main rafter or post not to exceed 12' 0" in length between joints

2.05 RIDGE

A. An extruded aluminum ridge shall be furnished and placed at the peak of the structure. Ridge shall be provided with continuous hinge flanges to receive ridge ventilating sash on each side of the ridge to divert condensation to drip gutters of roof bars.

2.06 GABLE RAFTERS AND CORNER TRIM

A. Specially extruded gable rafters and corner trim shall be provided which shall also provide in the same extrusion shoulders to receive specified roof glazing, vertical side and gable glazing and glazing bars and also suitable stops onto which side sash can be closed. This corner trim and gable rafter shall be neatly mitered and spliced at the eave to provide a smooth detail at this point. These shall be securely fastened to the structural members forming the gable end.

2.07 WALLS SILLS

A. An extruded aluminum wall sill shall be seated on all foundation walls. The joints of wall sill shall occur at main rafters or posts. The extruded aluminum wall sill shall be of the shape shown on the plans, and shall be capable of receiving either side sash or fixed glazing as the case may be. If side sash is used a continuous neoprene bulb gasket should be designed into the wall sill to act as a weather tight stop for the bottom rail of the transom sash.

2.08 GROUTING

A. After the greenhouse contractor has properly placed the wall sills, the mason contractor shall provide the necessary materials and labor to properly place the walls and point up between the wall and the sill to eliminate any discrepancies between the two and produce a finished joint.

2.09 TRANSOM SILL

A. An extruded aluminum transom sill shall be furnished where indicated on plan. Transom sill shall be securely fastened to the posts and shall be designed to accommodate either fixed glazing details: provisions for a continuous neoprene bulb gasket to act as a weather tight stop for the bottom rail of the transom sash if sash over fixed glazing is used.

2.10 GLAZING BARS

A. Extruded aluminum roof bars of sufficient size and mechanical properties to carry the design loads heretofore specified shall be placed in the roof and spaced 36" or 48" on center to receive the specified glazing material. chamber shall be provided on both the top and the bottom of this bar for fastening purposes. Shoulders to receive the roof glazing and condensation grooves to conduct primary condensation to a suitable disposable point shall be provided. These bars shall extend in one piece from the eave to the ridge and shall be bolted to purlins spaced not over 5"0" apart. Extruded aluminum glazing bars of sufficient size and section modules to carry the design loads heretofore specified shall be placed in the gables, extending from the wall sill to the gable rafter.

2.11 DOORS & FRAMES

A. Door frames shall be extruded aluminum shapes complete with stops and provision for hanging 1 3/4" thick aluminum doors. Doors 1 3/4" thick of aluminum construction shall be furnished at all openings of the size indicated on the drawings. A minimum of three (3) aluminum hinges shall be furnished for each 1 3/4" door. Doors 1 3/4" thick on exterior openings shall be arranged to open out. Doors 1 3/4" thick shall be of the size shown on the plan and consist of a lower kick panel of aluminum and upper glazing of safety glass.

2.12 GABLES

A. Gables with fixed glazing from sill to gable rafter, except at door openings, shall be constructed in a similar manner to the roof and side using extruded aluminum shapes as indicated on the drawings.

2.13 GLASS GLAZING

A. All glass in the enclosure, except that in the roof sash and side sash, shall be bedded on the special elastic glazing strips. This strip shall cover the glass seat of the glazing bar throughout the entire length of each lite of glass set on the bar. After glass is set in place, a special elastic glazing compound shall be gunned in a bead between the top edge of the glass and the glazing bar. Aluminum bar caps shall then be applied to the bar covering the entire length of each lite of glass and made to conform to the laps in the glass and provide a uniform 1/2" lap. These caps shall be extruded aluminum, shaped with proper forming to exert a uniform, but not excessive pressure, along the

entire length of the glass lite. Each cap shall be held with a minimum of two stainless steel hex head self-tapping screws. Screws which hold bar caps shall be spaced not over 15 inches apart, nor shall any screw be placed closer than 1 1/2" from the end of the cap.

B. At the rafters, scaffold screws, 1" #14 stainless steel hex head screws shall be used to hold the caps. Such screws shall have sufficient thread to hold the caps firmly in place, yet provide sufficient shank protruding above the caps for support of scaffold planks.

C. All glass used for glazing of sash and doors shall be of such size as to completely fill the space between the various rails and munitions in one piece.

D. For roof and side sash an extruded vinyl glazing strip shall be used for bedding and sealing the glass after which caps shall be applied as previously described using stainless steel self-tapping screws.

2.14 ACRYLIC GLAZING

A. All acrylic glazing in the enclosure shall be glazed into an aluminum gasketed glazing system approved by the acrylic manufacture. Glazing system shall provide closure for all edges of acrylic glazing panels. The glazing system shall provide a gasketed anti sag spacer at all purlins centered between glazing rafters on roof only. There should be provisions made within the glazing system to handle expansion and contraction as required by the acrylic manufacture.

2.16 POLYCARBONATE GLAZING

A. All polycarbonate glazing in the enclosure shall be glazed into an aluminum glazing system as approved by the polycarbonate manufacture in order to meet the specifies needs spacers and point fasteners must be compatible with the polycarbonate material. There should be provisions made within the glazing system to handle expansion and contraction as required by the polycarbonate manufacture.

2.17 SCAFFOLDING

A. The Contractor for the greenhouse shall furnish sufficient scaffolding for one section of the roof on one side between the eave and ridge. Such scaffolding shall be of specially formed aluminum to extend for one section, fit over the special scaffold screws at the truss members, and present a horizontal walking surface for maintenance and construction workers. This aluminum scaffolding shall be turned over to the owner at the conclusion of the job.

2.18 FLASHING

A. All flashing and counter-flashing shall be furnished and placed by the Sheet Metal Contractor. All flashing and counter-flashing shall be either aluminum or lead coated copper.

2.19 PAINTING

A. No painting shall be required on aluminum.

2.20 SASH VENTILATION

A. Ridge sash of the size indicated on the drawings, shall be furnished at the ridge and connected to the same with a continuous type hinge and arranged to open out. Sash for any given compartment, when assembled and installed, shall be continuous from one end to the other. A common muntin bar shall be used at all assembly joints. Ridge vents shall be made up of a top rail, bottom rail and muntins of extruded aluminum, and bolted together in accordance with manufacturer's instructions.

B. Side sash to the size indicated on the drawings with continuous type hinges, either connected to the eave, gutter adapter or transom sill adapter, shall be furnished and arranged to open out. Side sash for any given compartment, when assembled and installed, shall be continuous from one end to the other. A common muntin bar shall be used at all assembly joints. Side sash shall be made up of a top rail, bottom rail and muntins of extruded aluminum and belted together in accordance with manufacturer's instructions.

C. All sash shall have provision made at the hinge point to prevent creeping of the sash. All sash shall be dry glazed, utilizing a specially formed glazing gasket or channel that shall border the glazing continuously with no interruptions or joints where the glazing meets the muntin bars and the sash top rail. All sash should close on a continuous neoprene bulb gasket to insure a weather tight seal. All sash should have provisions for operators.

2.21 AUTOMATIC OR MANUAL SASH

A. Sash ventilators as indicated on drawings shall be operated by one of two ways: manual operation by use of a hand crank or chain pull machine for each sash; automatic operation with a VC elective control motor for each sash as manufactured by Wadsworth Control Systems. The power unit shall be provided with a quick reversing single phase motor with sufficient power to operate the sash to operate the sash satisfactory under the conditions required with a gear reduction train.

2.22 HEATING

A. A separate heating system shall be provided for each compartment to maintain the greenhouse at 70 degrees Fahrenheit with an outside temperature of minus 10 degrees Fahrenheit under conditions of 15 mph wind.

B. Control system of the heating system shall be by central control system.

C. Gas lines and connections, or oil tank, lines and connections and/or electrical power and control wiring and connections shall be provided by others.

2.23 EVAPORATIVE COOLING

A. Supply and install an exhaust fan/pad cooling system designed to achieve maximum cooling performance, properly locating and sizing exhaust fans and cooling pad system according to Acme Engineering's "Climate Control Handbook" using Acme equipment or an approved equal.

2.24 FAN JET VENTILATION

A. A fan jet ventilation and re-circulating system of sufficient air flow capacity to maintain proper heat balance and produce thorough mixing of air shall be sized and furnished according to Acme's Engineering's "Climate Control Handbook" using Acme equipment or an approved equal.

2.25 INTEGRATED CONTROLLER

A. A solid-state sequential controller shall be provided for each compartment to operate all ventilating, cooling, heating, and circulating equipment in proper sequence to provide a full range of controlled atmospheric conditions within a greenhouse from maximum heating to maximum cooling.

B. The unit shall contain the ability to switch from day to night setpoints when activated by a photo-electric switch or a manual switch.

C. Each stage shall have one temperature adjustment for activating equipment and a separate adjustment to deactivate equipment before temperature reaches setpoint to prevent setpoint overshoot.

D. Each stage within the sequential controller shall be individually adjustable + or - 10 degrees from setpoint.

E. The temperature sensor shall be an aspirated sensor, using a hood or screen to shield the sensor from direct sunlight.

2.26 ELECTRICAL

A. All power and control wiring, motor starters, disconnect switches, lighting and convenience outlets shall be provided by others. It shall be the responsibility of the enclosure manufacturer to provide wiring details of specialty equipment and controls.

2.27 PLUMBING

A. Water lines, water connections to equipment, hose bibs and drainage shall be provided by others.

END OF SECTION 13 12 30

SECTION 13123
GREENHOUSE SYSTEMS (R/S SERIES II)

PART 1 - GENERAL

1.01 GENERAL

A. Furnish and install the greenhouse as hereinafter specified and shown on the drawings. Where the drawings and the specifications are in conflict the specifications shall govern. Dimensions shown are nominal and may vary according to manufacturers' standards provided the area covered is not less than that shown. Ludy Greenhouse Mfg. Corp. standard clear span width is (20'-6", 25'-0", 30'-0", 35'-6", 41'-6") center line to center line of post.

B. General conditions that shall apply to this contract are the "General Conditions of the Contract for Construction" A.I.A. Document A201 current edition.

C. The standard of quality for this particular greenhouse shall be Ludy Greenhouse Mfg. Corp. R/S Series II rigid frame. If another make of greenhouse is substituted the substitute manufacturer shall apply for permission to quote 14 days prior to bid date and submit sufficient shop drawings to the owner (architect) for written approval prior to bid.

D. The general contractor shall use as his base bid Ludy Greenhouse Manufacturing Corporation. If he desires to substitute another manufacturer, he or she shall so indicate and offer an alternate add or deduct for such substitution.

1.02 SCOPE

A. This portion of the specifications does not cover the furnishing of the greenhouse concrete, grouting, masonry work of any description, plumbing, electrical (either power supply or control wiring), utility connections, flashing or counter-flashing. These items shall be the responsibility of the General Contractor or selected Sub-contractors rather than the Greenhouse Contractor.

1.03 PLANS AND SUBMITTALS

A. A complete set of shop drawings including details shall be submitted by the greenhouse manufacturer for the engineers and architects approval prior to fabrication. Submittals shall also include structural calculations and data on all equipment, glazing and doors supplied by greenhouse manufacturer. Submittals shall meet structural requirements of applicable local or state building codes for building permits, except concrete and foundation design shall be by others. **Plans and calculations shall be signed and sealed by a licensed engineer in the state of installation.**

1.04 ERECTION OF GREENHOUSE

A. The greenhouse shall be erected by the greenhouse manufacturer or by a qualified greenhouse specialty contractor approved in writing by the manufacturer. The greenhouse contractor shall have at least five years' experience in building greenhouses of the type specified. The General Contractor shall have all site conditions correct and ready prior to greenhouse erection. No masonry, foundation, or footer installation shall be made prior to approval of greenhouse plans.

B. GROUTING: After the greenhouse contractor has placed the wall glazing framing, the masonry contractor shall provide the necessary materials and labor to grout between the wall and the sill to eliminate any discrepancies between the two and produce a finished joint.

PART 2 - MATERIALS

2.01 STANDARD OF QUALITY

A. All structures shall be designed to requirements of state/local building codes.

B. Greenhouse structure(s) shall be designed in accordance with current AISI Specifications for Design of Cold - Formed Steel Structural Members and AISC Specifications for Structural Steel Buildings. Greenhouse structure(s) shall include sufficient bracing for the resistance to wind forces. Bottom chord members as well as other truss members shall be adequate to resist compressive loads produced by horizontal wind loads and roof uplift produced by wind.

2.02 MATERIALS AND COMPONENTS

A. Structures shall be designed and detailed according to accepted engineering practice. Framing shall consist of trusses, hot dip galvanized after fabrication, on 12'-0" centers spanning the full width of the structure with a 6/12 roof pitch. No castings, either of aluminum or aluminum alloy, shall be permitted for joining structural members at joints subject to stress in which tensile strength is a factor.

B. Primary framing shall be 50,000 P.S.I. yield strength steel.

1. Trusses shall be of 2" square steel tube (or heavier) with welded plate connections and hot dip galvanized after fabrication. Trusses shall ship from factory assembled in no more than two pieces ready to attach at the post connection. All tolerances shall be held to an absolute minimum in order to secure proper fit of the steel members.

2. Truss support posts shall be 4" square steel tube (or heavier) furnished and placed at all truss bearing locations. Aluminum cast or aluminum alloy connectors are not acceptable.

3. Trusses shall be connected to the side wall post by a welded post top connector hot dip galvanized after fabrication.

4. Galvanized steel roof purlins, of size required, shall be prefabricated before shipment from greenhouse manufacturer.

5. Provide all other structural members required to complete the framework of the greenhouse that are not mentioned above such as; bracing, clips, lugs, girts, and fasteners.

C. Secondary framing shall be extruded aluminum, members such as roof bars, ridge, sash, etc. Members shall be mill finish, with appropriate heat treatment of alloy 6063-T6 or 6063-T5. Sheet aluminum shall be of alloy 3003-h14.

2.03 FASTENERS

A. All structural connections shall be attached with hot dip galvanized (ASTM-307 bolts) or stainless steel fasteners. All aluminum to aluminum connections shall have aluminum or stainless steel fasteners. All screws and self-tapping screws shall be stainless steel or hot dip galvanized.

2.04 GUTTERS

A. Gutters shall be 12-gauge steel fabricated for connection at the post tops, and also to accept roof and side wall glazing closures. Gutters shall be hot dip galvanized after fabrication. Outlet tube(s) shall be provided where indicated on the drawings.

2.05 EXPANSION AND CONDENSATION CONTROL

A. All members shall handle expansion individually to prevent an accumulation of expansion in one direction from several members. Roof glazing bars shall incorporate condensation channels to conduct primary condensation to disposal points at gutter.

2.06 GLAZING

A. GLASS - All glass shall be 5/32 inch clear tempered. Roof and sidewall will be 3' on center spacing and gable ends will be 2' on center. All cut lites to be annealed glass except lites around doors. All glazing compounds used for bedding of glass shall be extruded butyl compound with a continuous built in shim. The glass shall be sealed on the outside with gun grade butyl glazing compound throughout the length before applying extruded aluminum bar cap.

B. ACRYLIC Double-skinned sheets - 8mm or 16mm Exolite No-Drip® or equivalent. Material shall be glazed into an extruded aluminum gasketed system approved by the acrylic manufacturer and designed to provide for expansion and contraction.

C. POLYCARBONATE Double-skinned sheets - 8mm or 16mm material shall be glazed into an extruded aluminum glazing system approved by the Polycarbonate manufacturer. Supplementary materials shall be compatible with Polycarbonate sheets. Expansion and contraction shall be provided for. Polycarbonate sheets shall have UV protection.

D. POLYCARBONATE corrugated sheets - Supplementary materials shall be compatible with Polycarbonate sheets. Expansion and contraction shall be provided for. Polycarbonate sheets shall have UV protection.

2.07 VENTS COMPONENTS

A. ROOF VENTS: Single or double run(s) of ridge vents shall be made up of a top rail, bottom rail and mullions of extruded aluminum and bolted together in accordance with manufacturers' instructions. All vents shall have provisions made at the hinge point to prevent creeping of the vents. Vents shall be the size indicated on the drawings with a continuous socket hinge, arranged to open out. Vents for any given compartments, when assembled and installed, shall be continuous from one end to the other.

B. SIDE VENTS: Single run of vents shall be made up of a top rail, bottom rail and mullions of extruded aluminum and bolted together in accordance with manufacturers' instructions. All vents shall have provisions made at the hinge point to prevent creeping of the vents. Vents shall be the size indicated on the drawings with a continuous socket hinge, arranged to open out. Vents for any given compartments, when assembled and installed, shall be continuous from one end to the other.

C. GABLE VENTS: Single run of vents shall be made up of a top rail, bottom rail and mullions of extruded aluminum and bolted together in accordance with manufacturers' instructions. All vents shall have provisions made at the hinge point to prevent creeping of the vents. Vents shall be the size indicated on the drawings with a continuous socket hinge, arranged to open out. Vents for any given compartments, when assembled and installed, shall be continuous from one end to the other.

2.08 VENT OPERATORS

A. RACK AND PINION ARMS: All vents shall be operated with rack and pinion system consisting of aluminum rack arm, aluminum housing and zinc pinion gear assemblies. Racks are attached to bottom rail of vents with aluminum clips and zinc plated steel cotter pins. No less than two sets of rack and pinion arms shall be provided for each 12' section on vent. Provide 1.66" diameter galvanized drive shaft with 6 bolt connection couplings. Shaft hangers with nylatron bushings shall be provided to support roof and side/gable vent drive shaft.

B. ELBOW ARM: All vents shall be operated with elbow arm system consisting of aluminum arm and aluminum rod assemblies. Arm assemblies are attached to bottom rail of vents with aluminum clips and zinc plated steel cotter pins. No less than two sets of rack and pinion arms shall be provided for each 12' section on vent. Provide 1.66" diameter galvanized drive shaft with 6 bolt connection couplings. Shaft hangers with nylatron bushings shall be provided to support roof and side/gable vent drive shaft.

2.09 AUTOMATIC OR MANUAL MACHINES

A. Ventilators as indicated on drawings shall be operated by:

1. Manufacturer shall provide a manual machine with a hand crank or chain pull for each vent.

2. Manufacturer shall provide an automatic machine. The power unit shall be provided with a quick reversing single phase motor with sufficient power to operate the sash as required, complete with open and close limit switches.

2.12 BENCHES

A. Bench specifications are of the Ludy Bench, manufactured by Ludy Greenhouse Mfg. Corp.. Standard width of benches is as follows:

1.	Rolling	Stationary
	------	3'-0"
	------	3'-6"
	------	4'-0"
	5'-0"	5'-0"

5'-6"	5'-6"
6'-0"	6'-0"

Rolling or stationary benches of the size and quantity shown on the drawings shall be provided. Support system shall be 1 .5" square 16ga. galvanized steel tubing spaced at 6'-0" intervals. Bench tops shall include 1" square 18ga. galvanized steel tubing crosspieces spaced at 2'-0" on center, extruded aluminum side and end rails with 2 1/2" or 5" high side rails. Tops shall be covered with open mesh 3/4" - #13 hot dip galvanized expanded metal. Two runs of 1.315" O.D. 14ga. galvanized steel tubing shall be provided to support bench tops above the support system. Extruded aluminum fittings with aluminum bolts and stainless steel screws shall be used to assemble the benches. Bench height shall be 2'-6" from finished floor to expanded metal.

B. For freestanding: two runs of 1.5" square 16ga. galvanized steel tubing shall be installed 10" above the finished floor to stabilize the support system. Elevator bolts shall be used to level benches.

PART 3 - EXECUTION

3.01 FLASHING

A. All flashing and counter-flashing shall be furnished and placed by the Sheet Metal Contractor. All flashing and counter-flashing shall be either aluminum or lead coated copper.

3.02 INSTRUCTION

A. Instruct owner on use of greenhouse and systems. Provide operation and maintenance manuals to owner.

3.03 WARRANTIES

A. The greenhouse structure(s) shall be free from all defects in materials and workmanship for one year from construction completion. All coverings will carry the respective manufacturer's warranties.

END OF SECTION 13 12 30

SECTION 22 14 13
FACILITY WATER DISTRIBUTION

PART 1 GENERAL

1.1 PROJECT INCLUDES

A. Provide facility water distribution systems within the building.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

C. Operation and Maintenance Data: Submit manufacturer's operation and maintenance data, including operating instructions, list of spare parts and maintenance schedule.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. Standards:
1. Materials, Products, and Installation: ASME B31.9.
2. Plastic Piping Components: NSF 14.

C. Compliance: ASME B31.9.

PART 2 PRODUCTS

2.1 MATERIALS

A. Facility Water Distribution Systems:
1. Manufacturers: MIFAB, Inc., Schluter Systems LP or equal.
2. Application: Locations indicated.
3. Pipes and Tubes:
a. Hard Copper Tube: ASTM B 88, Types K, L, and M, water tube, drawn temper.
b. Soft Copper Tube: ASTM B 88, Types K and L, water tube, annealed temper.
c. Copper Drainage Tube: ASTM B 306, Type DWV, drawn temper.
d. Steel Pipe: ASTM A 53, Type S, Grade A, Schedule 40, galvanized, plain ends.
e. Ductile-Iron Pipe: AWWA C151, with AWWA C104 lining.
f. Flanged Ductile-Iron Pipe: AWWA C115 with AWWA C104 lining.
g. Hub and Spigot, Cast-Iron Soil Pipe: ASTM A 74, service class.
h. Hub-less, Cast-Iron Soil Pipe: CISPI 301.
4. Fittings and Valves:
a. Pressure and Drainage Fittings for Pipe and Tubes: Suitable for service.
b. Joining Materials: Solder, brazing and welding filler metals; couplings.
c. Valves: Gate, globe, ball, butterfly, and check valves suitable for service.

5. Plumbing Specialties:
    a. Water Meters: AWWA C700-C710 series.
    b. Backflow Preventers: ASSE Standard backflow preventers
    c. Water Pressure Regulators: ASSE 1003.
    d. Water Filters: Cartridge-type suitable for potable water.
    e. Thermostatic Water-Mixing Valves: ASSE 107, manually adjustable.
    f. Water-Tempering Valves: Manually adjustable, thermostatically controlled.
    g. Cleanouts: Cast-iron cleanouts, ASME A112.36.2M.
    h. Floor Drains: Cast-iron trench drains, ASME A112.21.1M.
    i. Roof Drains: Cast-iron body, ASME A112.21.2M.
    j. Interceptors: Grease, grease recovery, oil, and solids types suitable for service.
    k. Sleeve Penetration Systems: UL 1479, through-penetration firestop assembly.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials in proper relation with adjacent construction and with uniform appearance for exposed work. Coordinate with work of other sections. Comply with applicable regulations and code requirements. Provide proper clearances for servicing.

B. Support piping properly. Pitch to drain points. Install with pipe expansion loops, mechanical expansion joints, and anchors.

C. Maintain indicated fire ratings of walls, partitions, ceilings and floors at penetrations. Seal with firestopping to maintain fire rating.

D. Clearly label and tag all components.

E. Test and balance all systems for proper operation.

F. Restore damaged finishes. Clean and protect work from damage.

G. Instruct Owner's personnel in proper operation of systems.

END OF SECTION

SECTION 22 3300 - ELECTRIC, DOMESTIC WATER HEATERS

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. Thermostat-control, electric, tank-less, domestic water heaters.
2. Water heater accessories.

1.3 SUBMITTALS

A. Product Data: For each type and size of domestic-water heater indicated.

B. Shop Drawings:

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

C. Domestic Water Heater Labeling: Certified and labeled by testing agency acceptable to authorities having jurisdiction.

1.4 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 90.1 Compliance: Applicable requirements in ASHRAE/IESNA 90.1.

C. ASME Compliance: Where ASME-code construction is indicated, fabricate and label commercial, domestic water heater storage tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

D. NSF Compliance: Fabricate and label equipment components that will be in contact with potable water to comply with NSF 61, "Drinking Water System Components - Health Effects."

1.5 WARRANTY

A. 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.

1. Warranty Periods: From date of Substantial Completion.

a. Electric, Tank-less, Domestic Water Heaters: One year.

PART 2 - PRODUCTS

2.1 ELECTRIC, TANKLESS, DOMESTIC WATER HEATERS

A. Thermostat-Control, Electric, Tank-less, Domestic Water Heaters:

1. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on drawings or comparable product by the following:

    a. Stiebel Eltron Mini Electric Tankless Water Heater

2. Standard: UL 499 for electric, tank-less, (domestic water heater) heating appliance.

3. Construction: Copper piping or tubing complying with NSF 61 barrier materials for potable water, without storage capacity.

    a. Connections: ASME B1.20.1 pipe thread.
    b. Pressure Rating: 150 psig**.**
    c. Heating Element: Resistance heating system.
    d. Temperature Control: Thermostat.
    e. Safety Control: High-temperature-limit cutoff device or system.
    f. Jacket: Aluminum or steel with enameled finish or plastic.

4. Support: Bracket for wall mounting.

5. Capacity and Characteristics: As indicated on the drawings.

2.2 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.

B. Hydrostatically test domestic water heaters to minimum of one and one-half times pressure rating before shipment.

C. Electric, domestic-water heaters will be considered defective if they do not pass tests and inspections. Comply with requirements in Division 01 Section "Quality Requirements" for retesting and reinspecting requirements and Division 01 Section "Execution" for requirements for correcting the Work.

D. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 DOMESTIC WATER HEATER INSTALLATION

A. Electric, Tank-less, Domestic Water Heater Mounting: Install electric, tank-less, domestic water heaters 18 inches on wall bracket. Provide Stiebel Eltron Mini Electric Tankless Water Heater.

1. Maintain manufacturer's recommended clearances.
2. Arrange units so controls and devices that require servicing are accessible.
3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
4. Install anchor bolts to elevations required for proper attachment to supported equipment.
5. Anchor domestic-water heaters to substrate.

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.

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 commercial-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 water-heater drain piping as indirect waste to spill by positive air gap into open drains or over floor drains. Install hose-end drain valves at low points in water piping for electric, domestic-water heaters that do not have tank drains.

E. Install thermometers on outlet piping of electric, domestic water heaters.

F. Install piping-type heat traps on inlet and outlet piping of electric, domestic-water heater storage tanks without integral or fitting-type heat traps.

G. Fill electric, domestic water heaters with water.

H. Charge domestic water compression tanks with air.

3.2 CONNECTIONS

A. Comply with requirements for piping specified in Division 22 Section "Domestic Water Piping."

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. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
3. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation.
4. 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.

C. Prepare test and inspection reports.

END OF SECTION 22 3300

SECTION 22 40 00
PLUMBING FIXTURES

PART 1 GENERAL

1.1 SUMMARY

A. Provide plumbing fixtures and trim.

1.2 SUBMITTALS

A. Product Data and Shop Drawings: Submit manufacturer's product data and installation instructions for each material and product used. Submit shop drawings indicating material characteristics, details of construction and connections.

B. Operation and Maintenance Data: Submit manufacturer's operation and maintenance data, including operating instructions, list of spare parts and maintenance schedule.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions. Standards include: ASME B31.9 (Materials, Products, and Installation) and NSF 14 (Plastic Piping Components). Compliance includes: ANSI A117.1 and local regulations.

B. Accessibility Requirements: ADAAG and local requirements.

PART 2 PRODUCTS

2.1 MATERIALS

A. Plumbing Fixtures:
   1. Plumbing Fixtures at locations indicated:
      a. Exterior hose bibs with outlet boxes (shutoff, recessed wall-mounting), by W. Webb, Prier, McMaster-Carr or equal.
      b. Fittings: Supplies, stops, and escutcheons.
      c. Toilet by American Standard.
      d. Stainless Steel Utility Sink by Regency.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials in proper relation with adjacent construction and with uniform appearance for exposed work. Coordinate with work of other sections. Comply with applicable regulations and code requirements. Provide proper clearances for servicing.

B. Support piping properly. Pitch to drain points. Install with pipe expansion loops, mechanical expansion joints, and anchors. Maintain indicated fire-ratings and water-proofing of walls, partitions, ceilings and floors at penetrations. Seal with firestopping to maintain fire rating and weather protection. Clearly label and tag all components, test and balance all systems for proper operation.

END OF SECTION

SECTION 23 00 00
HEATING, VENTILATING, AND AIR CONDITIONING

PART 1 GENERAL

1.1 SUMMARY

A. Provide unit heater in bath.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

C. Operation and Maintenance Data: Submit manufacturer's operation and maintenance data, including operating instructions, list of spare parts and maintenance schedule.

PART 2 PRODUCTS

2.1 MATERIALS

A. Heating:
   1. Manufacturer: Broan or equal.
   2. Application: Decentralized heating.
   3. Sustainable Design: Energy efficient equipment, fixtures and commissioning.
   4. Type: Electric Unit Heater.
      a. Bathroom heater.
   5. Components: Suitable for service.
      a. Motors.
      b. Hangers and supports.
      c. Sealants and tape.
      d. Heat tracing.
      e. Identification devices.
      f. Testing, adjusting, and balancing devices.
      g. Instrumentation and control devices.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials in proper relation with adjacent construction and with uniform appearance for exposed work. Coordinate with work of other sections. Comply with applicable regulations and building code requirements.

B. Clearly label and tag all components.

C. Test and balance all systems for proper operation.

D. Restore damaged finishes. Clean and protect work from damage.

E. Instruct Owner's personnel in proper operation of systems.

END OF SECTION

SECTION 26 05 00
COMMON WORK RESULTS FOR ELECTRICAL

PART 1 GENERAL

1.1 SUMMARY

A. Provide common work results for electrical systems.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction. Shop drawings shall be prepared and stamped by a qualified engineer licensed in the jurisdiction of the project.

C. Operation and Maintenance Data: Submit manufacturer's operation and maintenance data, including operating instructions, list of spare parts and maintenance schedule.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 MATERIALS

A. Common Work Results for Electrical:
   1. Manufacturers: Square D, Schneider Electric, FSR Inc., or equal.
   2. Application: Locations indicated.
   3. Medium-Voltage Cables:
      a. Single and Multiple Conductor Types: UL 1072.
      b. Cable: Cross-linked polyethylene, XLP, insulated, NEMA WC 7.
      c. Cable: Ethylene propylene rubber, EPR, insulated, NEMA WC 8.
      d. Conductors: Class B stranded, annealed copper.
      e. Cable Jacket: PVC extruded over metal armor.
      f. Metallic Shielding: Solid copper wires.
      g. Cable Voltage Rating: 15 kV phase to phase.
      h. Insulation Thickness: Corresponding to referenced standard.
      i. Circuit Identification: Color-coded tape.
      j. Three-Conductor Cable Assembly: Shield conductors with grounding conductor.
      k. Type MC Cable Armor: Galvanized steel interlocked armor.
      l. Splices, Terminations, Kits, Cable Seals, Junctions: Suitable for service.
      m. Arc-Proofing Materials: UL fireproofing intumescent tape.
      n. Fault Indicators: Manual reset fault indicator to clamp to cable sheath.
   4. Low-Voltage Cables:
      a. Armored Cable: UL Types AC.
      b. Metal-Clad Cable in Cable Trays: UL Type MC.
      c. Nonmetallic-Sheathed Cable for Lighting Wiring: UL Type NM and NMC.
      d. Aboveground Service Entrance Cable: UL Type SE.

e. Underground Service Entrance Cable: UL Type USE.
f. Underground Feeder and Branch-Circuit Cable: UL Type UF.
g. Portable Cord - Flexible Pendant Leads to Outlets and Equipment: UL Type S.
h. Control/Signal Transmission Media: Single conductor coaxial type.
i. Flat Cabling System for Power Under Carpet Tile: Factory-laminated assembly.
j. Flat Cabling System for Tel/Data Transmission Under Carpet Tile: Flat cable.
k. Fiber Optic Cables: Single channel low-loss glass type.

5. Wire Components:
   a. Conductors, No. 10 AWG and Smaller: Solid.
   b. Conductors, No. 8 AWG and Larger: Stranded.
   c. Insulation: THW, THHN/THWN or XHHW as applicable.
   d. Jackets: Factory-applied nylon or PVC.
   e. Conductor Material: Copper.
6. Metal Conduit and Tubing:
   a. Rigid Steel Conduit: ANSI C80.1.
   b. Intermediate Steel Conduit: UL 1242.
   c. Electrical Metallic Tubing (EMT) and Fittings: ANSI C80.3.
   d. Flexible Metal Conduit: UL 1 zinc-coated steel.
   e. Liquid-tight Flexible Metal Conduit and Fittings: UL 360.
7. Nonmetallic Conduit and Ducts:
   a. Electrical Nonmetallic Tubing (ENT): NEMA TC 13.
   b. Rigid Nonmetallic Conduit (RNC): NEMA TC 2 and UL 651, PVC.
   c. Underground PVC and ABS Plastic Utilities Duct: NEMA TC 6.
   d. PVC and ABS Plastic Utilities Duct Fittings: NEMA TC 9.
   e. Liquid-tight Flexible Nonmetallic Conduit and Fittings: UL 1660.
8. Boxes and Fittings:
   a. Cabinet Boxes: UL 50, sheet steel, NEMA 1.
   b. Pull and Junction Boxes: UL 50, steel boxes.
   c. Metal Outlet, Device and Small Wiring Boxes: UL 514A and OS 1.
   d. Nonmetallic Outlet, Device and Small Wiring Boxes: NEMA OS 2.
9. Raceway Accessory Materials:
   a. Conduit Bodies: NEC requirements.
   b. Wireways: NEC requirements.
   c. Surface Raceways, Metallic: Galvanized steel, with snap-on covers.
10. Cable Trays:
    a. Materials: Mill galvanized steel.
    b. Configuration: Ladder type, trough-type, solid-bottom type, channel type.
    c. Covers: Solid type, louvered type, and ventilated-hat type.
11. Components:
    a. Cables, conduit, and tubing.
    b. Grounding and bonding devices.
    c. Hangers and supports.
    d. Identification devices and warning labels.
    e. Service entrance components (meters and disconnects).

PART 3 EXECUTION

3.1 INSTALLATION

A. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials in proper relation with adjacent construction and with uniform appearance for exposed work. Coordinate with work of other sections. Comply with applicable regulations and code requirements. Provide proper clearances for servicing. Clearly label and tag all components. Test and balance all systems for proper operation.

END OF SECTION

SECTION 26 51 00
INTERIOR LIGHTING

PART 1 GENERAL

1.1 SUMMARY & SUBMITTALS & QUALITY ASSURANCE

A. Provide interior lighting.

B. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

C. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

D. Operation and Maintenance Data: Submit manufacturer's operation and maintenance data, including operating instructions, list of spare parts and maintenance schedule.

E. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions. Comply with NFPA 70 "National Electrical Code."

PART 2 PRODUCTS

2.1 MATERIALS

A. Typical Lighting Manufacturers: Lithonia, or equal.
1. Application: Locations indicated.
2. Type: Exit Lighting by Lithonia Lighting, LE-LRE, Signature LED Exit, Custom Signage. UL 924, self-powered battery type and luminous source type.
3. Type: Emergency Lighting by Lithonia Lighting, TCU Emergency Lighting Unit.

B. Specialty Lighting Manufacturer: Encapsulite, or equal.
1. Type: WGP7-4LED36W-40K-CL-SS, Suitable for damp/wet areas.
2. Application and Components: Locations indicated, and suitable for service.
3. Light Source Information: LED/Electronic Driver, 4000K.
4. Dimming: 1-10V or Dali.
5. Installation: Horizontal, angled suspension or surface mounted.
6. Optics: Clear polycarbonate diffuser.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials in proper relation with adjacent construction and with uniform appearance for exposed work. Coordinate with work of other sections. Provide proper clearances for servicing. Test all systems for proper operation. Label circuits in elec. panels.

END OF SECTION

SECTION 26 56 00 – EXTERIOR LIGHTING

PART 1 GENERAL

A. SUMMARY: Provide exterior lighting.

B. SUBMITTALS

1. Product Data: and Shop Drawings: Submit manufacturer's product data and installation instructions for each material and product used. Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

2. Operation and Maintenance Data: Submit manufacturer's operation and maintenance data, including operating instructions, list of spare parts and maintenance schedule.

C. QUALITY ASSURANCE

1. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions. Comply with NFPA 70 "National Electrical Code."

PART 2 PRODUCTS

A. MANUFACTURERS

1. LE PRO LED Flexible Strip Light, or equal:
    a. LED type: 2835 SMD LED,
    b. Switching Cycles: 25000,
    c. Power Consumption (W): 18,
    d. Dimmable,
    e. Color Temperature: 3000K,
    f. Length: 16.4 feet,
    g. Brightness: 1200 lumens,
    h. Input Voltage: 12V DC,
    i. Light Color: Warm White,
    j. And Waterproof.
2. Kuzco Lighting: Nordic LED or equal:
    a. Grey powder-coated finish,
    b. Parabolic aluminum reflector,
    c. Dimmer Range: 100%-10%,
    d. Material: Die-cast Aluminum,
    e. Shade Material: Tempered Glass,
    f. Dimmable, Electronic low voltage (ELV),
    g. Lighting Style: Downlight,
    h. Location Rating: ETL Listed Wet,
    i. Warranty: Limited 5-Years

PART 3 EXECUTION

A. INSTALLATION

1. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials in proper relation with adjacent construction and with uniform appearance for exposed work. Coordinate with work of other sections. Comply with applicable regulations and code requirements. Provide proper clearances for servicing. Clean and protect work from damage.

SECTION 28 05 00
ELECTRONIC SAFETY AND SECURITY

PART 1 GENERAL

1.1 SUMMARY

A. Provide electronic safety and security systems.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.
   1. Shop drawings shall be prepared and stamped by a qualified engineer licensed in the jurisdiction of the project.

C. Operation and Maintenance Data: Submit manufacturer's operation and maintenance data, including operating instructions, list of spare parts and maintenance schedule.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. Compliance: UL 609, 681, 1023, 1076, 1641, FM approval as applicable.

PART 2 PRODUCTS

2.1 MATERIALS

A. Electronic Safety and Security Systems:
   1. Manufacturers: Honeywell Commercial Security, Vicon Industries, or equal.
   2. Type: Access control.
      a. Video surveillance.
      b. Burglary systems.
   3. Type: Electronic surveillance.
      a. Video surveillance.
      b. Alarm annunciation systems.
   4. Type: Electronic detection and alarm.
      a. Fire detection sensors.
      b. Smoke detection sensors.
      c. Carbon-monoxide sensors.
      d. Fire alarm pull stations.
      e. Fire alarm horns and strobes.
   5. Components: Suitable for service.
      a. Cables, conduit, and tubing.
      b. Grounding and bonding devices.
      c. Hangers and supports.
      d. Raceways, boxes, and cabinets.
      e. Cable trays.
      f. Identification devices and warning labels.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials in proper relation with adjacent construction and with uniform appearance for exposed work. Coordinate with work of other sections. Provide proper clearances for servicing.

B. Comply with National Electrical Code and building code requirements. Maintain continuity of circuits required to supply new or existing equipment in service.

C. Provide core drilling as required for new work.

D. Conceal conduit to the greatest extent practical.

E. Center ceiling-mounted elements in center of ceiling tiles as applicable.

F. Maintain indicated fire ratings of walls, partitions, ceilings and floors at penetrations. Seal with firestopping to maintain fire rating.

G. Test all systems for proper operation. Label circuits in electrical panels.

H. Restore damaged finishes. Clean and protect work from damage.

I. Instruct Owner's personnel in proper operation of systems.

END OF SECTION

SECTION 28 13 53
INTRUSION DETECTION

PART 1 GENERAL

1.1 SUMMARY

A. Provide intrusion detection system including sensors, signal equipment, controls, and alarm displays.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.
   1. Shop drawings shall be prepared and stamped by a qualified engineer licensed in the jurisdiction of the project.

C. Operation and Maintenance Data: Submit manufacturer's operation and maintenance data, including operating instructions, list of spare parts and maintenance schedule.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. Compliance: UL 609, 681, 1023, 1076, 1641, FM approval as applicable.

PART 2 PRODUCTS

2.1 MATERIALS

A. Intrusion Detection Systems:
   1. Manufacturers: Digital Watchdog, Honeywell Commercial Security, or equal.
   2. Application: Locations indicated.
   3. Sustainable Design: Commissioning.
   4. System Component Requirements:
      a. Surge protection.
      b. Interference protection.
      c. Tamper protection.
      d. Self-Testing devices.
      e. Antimasking devices.
      f. Addressable devices.
   5. Secure And Access Devices:
      a. Keypad and display module.
   6. Intrusion Detection System Components:
      a. Surge Protection: UL 1449.
      b. Interference Resistance: Not affected by radio frequency and electrical.
      c. Tamper Protection: Tamper protection switches.
      d. Intrusion Detection Devices: Types and mounting conditions as applicable.
      e. Alarm Contact Arrangement: Single-pole, double-throw type.
      f. Door and Window Switches: UL 634.
      g. Space Intrusion Detection Devices: UL 639, devices as applicable.

h. System Control Panel: UL compliance for type of unit.
i. Secure-Access Control Stations: Keypad, display module, key-operated switch.
j. Wire and Cable: Stranded copper.

7. Central-Station Control Units
   a. Annunciator.
   b. Central-station control-unit hardware.
   c. Central-station control-unit software.
   d. Audible and visual alarm devices.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials in proper relation with adjacent construction and with uniform appearance for exposed work. Coordinate with work of other sections. Provide proper clearances for servicing.

B. Comply with National Electrical Code and building code requirements. Maintain continuity of circuits required to supply new or existing equipment in service.

C. Provide core drilling as required for new work.

D. Conceal conduit to the greatest extent practical.

E. Center ceiling-mounted elements in center of ceiling tiles as applicable.

F. Maintain indicated fire ratings of walls, partitions, ceilings and floors at penetrations. Seal with firestopping to maintain fire rating.

G. Test all systems for proper operation. Label circuits in electrical panels.

H. Restore damaged finishes. Clean and protect work from damage.

I. Instruct Owner's personnel in proper operation of systems.

END OF SECTION

SECTION 28 31 00
FIRE DETECTION AND ALARM

PART 1 GENERAL

1.1 SUMMARY

A. Provide fire detection and alarm systems.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.
   1. Shop drawings shall be prepared and stamped by a qualified engineer licensed in the jurisdiction of the project.

C. Warranty: Submit manufacturer's standard warranty. Include labor and materials to repair or replace defective materials.

D. Operation and Maintenance Data: Submit manufacturer's operation and maintenance data, including operating instructions, list of spare parts and maintenance schedule.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. Compliance: NFPA 70, 71, 72, 72E, 72G, 72H.

PART 2 PRODUCTS

2.1 MATERIALS

A. Fire Detection and Alarm Systems:
   1. Manufacturers:
      a. Armstrong Monitoring;
      b. Brasch Environmental Technologies;
      c. Macurco Inc.
   2. Application: Locations indicated.
   3. Signal Transmission: Hard-wired individual circuits.
   4. Audible Alarm Indication: Horns, bells, and voice alarm messages.
   5. Interface: Air handling units control.
   6. Components: Suitable for service.
      a. Manual Pull Stations: Double-action type, metal or plastic.
      b. Smoke Detectors: UL 268, self-restoring type with visual indicator.
      c. Thermal Detectors: Fixed-temperature and rate-of-rise type.
      d. Flame Detectors: Ultraviolet type with delay.
      e. Fire Alarm Bells: Electric vibrating under-dome type.
      f. Visual Alarm Devices: Dual-voltage strobe lights.
      g. Fire Alarm Control Panel: UL 864.
      h. Graphic Annunciator: LED indicators on graphic building floor plan.
      i. Transmitter: Auto-dialer type.

j. Emergency Power Supply: Battery operated, 24-hour operation capacity.
k. Line-Voltage and Low-Voltage Circuits: Solid copper conductors, color-coded.
l. Conduit: Rigid steel, hardened, fire-rated.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials in proper relation with adjacent construction and with uniform appearance for exposed work. Coordinate with work of other sections. Provide proper clearances for servicing.

B. Comply with National Electrical Code and building code requirements. Maintain continuity of circuits required to supply new or existing equipment in service.

C. Provide core drilling as required for new work.

D. Conceal conduit to the greatest extent practical.

E. Center ceiling-mounted elements in center of ceiling tiles as applicable.

F. Maintain indicated fire ratings of walls, partitions, ceilings and floors at penetrations. Seal with firestopping to maintain fire rating.

G. Test all systems for proper operation. Label circuits in electrical panels.

H. Restore damaged finishes. Clean and protect work from damage.

I. Instruct Owner's personnel in proper operation of systems.

END OF SECTION

SECTION 32 30 00
SITE IMPROVEMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Provide site improvements and amenities.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 MATERIALS

A. Site Improvements:
1. Manufacturers: Ameristar Security Products; CityScapes International Inc.; Dero Bike Rack Co.
2. Application: Exterior site furnishings.
3. Type: Landscape edging.
4. Type: Trash receptacles, metal.
5. Type: Bicycle racks, galvanized steel.
6. Type: Bollards, concrete.
7. Type: Stone edging, granite.
8. Type: Site lighting, pole mounted fixtures.
9. Type: Site walls, masonry and concrete retaining wall.
10. Type: Site signage, directional and informational signage.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials and systems in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections.

B. Restore damaged finishes and test for proper function. Clean and protect work from damage.

END OF SECTION

SECTION 32 31 13

GALVANIZED CHAIN LINK FENCE AND GATES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. DIVISION 01 - GENERAL REQUIREMENTS: Drawings, quality, product and performance requirements, general and supplemental conditions apply as applicable to the project and project documents.

1.2 SUMMARY

A. This Section includes industrial/commercial chain link fence and gates specifications:
   1. Galvanized steel coated chain link fabric
   2. Galvanized steel framework and fittings
   3. Gates: cantilever slide
   4. Installation.
B. Related Sections:
   1. 01 33 23 Shop Drawings, product data
   2. 01 43 13 Manufacturers Qualifications
   3. 03 30 53 Miscellaneous Cast in Place Concrete
   4. 31 22 19 Finish Grading

1.3 REFERENCES

A. ASTM A392 Specification for Zinc-Coated Steel Chain-Link Fence Fabric

B. ASTM A780 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings

C. ASTM F552 Standard Terminology Relating to Chain Link Fencing

F. ASTM F567 Standard Practice for Installation of Chain Link Fence

G. ASTM F626 Specification for Fence Fittings

H. ASTM F1043 Specification for Strength and Protective Coatings of Steel Industrial Chain Link Fence Framework

I. ASTM F1083 Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures

J. ASTM F1184 Specification for Industrial and Commercial Horizontal Slide Gates

K. UL325 Automatic operators: Door, Drapery, Gate, Louver and Window

1.3 SUBMITTALS

A. Shop drawings: Site plan showing layout of fence location with dimensions, location of gates and opening size, cleared area, elevation of fence, gates, footings and details of attachments. Comply with the provisions of Section 01 33 23. Provide representative samples of chain link fabric, framework and fittings.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Framework, posts, rails, fabric, and fittings for chain link fence system: Merchants Metals or equal.

2.2 CHAIN LINK FABRIC

A. Steel Chain Link Fabric: [Height or heights indicated on drawings] <Select from table below and insert ASTM serial designation, mesh size, wire gauge, coating specification, including class and color when applicable, top/bottom selvage >

1. Zinc-Coated Steel Fabric: ASTM A392 hot dipped galvanized before weaving – GBW.
   a. Class 1 - 1.2 oz/ft² (366 g/m²)
   b. Class 2 - 2.0 oz/ft² (610 g/m²) <available 9 and 6 gauge>

2. Fabric Selection Table: Steel chain link mesh sizes and gauges produced in one-piece widths 3 feet (910 mm) to 12 feet (3660 mm)

Mesh Size In. (mm)	**6 gauge core** 0.192 in.	**9 gauge core** 0.148 in.	**11 gauge core** 0.120 in.	**11 1/2 gauge core** 0.113 in.	**12 Gauge core** 0.105 in.	**Notes**
1 (25)	N/M	yes	yes	N/A	N/A	N/M = Not manufactured
5/8 (16)	N/M	yes	yes	yes	yes*	*12 ga. only per F668
1/2 (13)	N/M	yes	yes	yes	yes*	
3/8 (10)	N/M	N/M	yes	yes	yes*	
	2170 lbf (9650 N)	1290 lbf (5740 N)	850 lbf (3780 N)	750 lbf (3340 N)	650 lbf (2895 N)	Wire Break Strength

3. Fabric selvage: Standard fabric selvage for 2 in (50 mm) mesh 72 in. (1.8 m) high and higher is knuckle finish at one end, twist at the other, [K&T]. Fabric less than 72 in (1.8 m), knuckle finish top and bottom, K&K.

2.3 ROUND STEEL PIPE FENCE FRAMEWORK

A. Round steel pipe and rail: Schedule 40 standard weight pipe, in accordance with ASTM F1083, 1.8 oz/ ft² (550 g/m²) hot dip galvanized zinc exterior and 1.8 oz/ft² (550 g/m²) hot dip galvanized zinc interior coating. Regular Grade: Minimum steel yield strength 30,000 psi (205 MPa):

B. Typical post and rail size for normal Commercial / Industrial applications:

Item	**Fence Height**	**Outside Diameter Inches (mm)**	***F1083 Schedule 40 Weight lb/ft (kg/m)**
Line	up to 6 ft. (1.8 m)	1.900 (48.3)	2.72 (4.0)
Terminal	up to 6 ft. (1.8 m)	2.375 (60.3)	3.65 (5.4)
Rails		1.660 (42.2)	2.27 (3.4)

*Regular Grade F1083 Schedule 40

2.4 TENSION WIRE

1. Metallic Coated Steel Marcelled Tension Wire: 7-gauge core (0.177 in.) (4.50 mm) marcelled wire complying with ASTM A824:
2. Type II Zinc-Coated, ASTM A817 Class 4 - 1.2 oz/ft² (366 g/m²)

2.5 FITTINGS

A. Tension and Brace Bands: Galvanized pressed steel complying with ASTM F626, minimum steel thickness of 12 gauge (0.105 in.) (2.67 mm), minimum width of 3/4 in. (19 mm) and minimum zinc coating of 1.20 oz/ft² (366 g/m²). Secure bands with 5/16 in. (7.94 mm) galvanized steel carriage bolts.

B. Terminal Post Caps, Line Post Loop Tops, Rail and Brace Ends, Boulevard Clamps, Rail Sleeves: In compliance to ASTM F626, pressed steel galvanized after fabrication having a minimum zinc coating of 1.20 oz/ft² (366 g/m²).

C. Truss Rod Assembly: In compliance with ASTM F626, 3/8 in. (9.53 mm) or 5/16” (7.94 mm) diameter steel truss rod with a pressed steel tightener, minimum zinc coating of 1.2 oz/ft² (366 g/m²), assembly capable of withstanding a tension of 2,000 lbs. (970 kg).

D. Tension Bars: In compliance with ASTM F626. Galvanized steel one-piece length 2 in. (50 mm) less than the fabric height. Minimum zinc coating 1.2 oz. /ft² (366 g/m²).

   a. Bars for 2 in. (50 mm) and 1 ¾ in. (44 mm) mesh shall have a minimum cross section of 3/16 in. (4.8 mm) by 3/4 in. (19 mm).
   b. Bars for 1 in. (25 mm) mesh shall have a cross section of 1/4 in. (6.4 mm) by 3/8 in. (9.5 mm).
   c. Small mesh 3/8 in. (10 mm), 1/2 in. (13 mm) and 5/8 in. (16 mm) shall be attached (sandwiched) to the terminal post using a galvanized steel strap having a minimum cross section of 2 in. (51 mm) by 3/16 in. (4.8 mm) with holes spaced 15 in. (381 mm) on center to accommodate 5/16 in. (7.9 mm) carriage bolts which are to be bolted thru the strap the mesh and thru the terminal post.

2.6 HORIZONTAL SLIDE GATES

A. Cantilever Slide Gates: SECURE-TRAC or equal made in accordance with ASTM F 1184 Type II Class 2, and in compliance with UL-325, and ASTM 2200. Gate to be made of Aluminum Alloy 6005A-T61. All square members are 2" sq. weighing 0.94 lb/FT (139 kg/m). Complete frame welded to top one-piece track and 4" x 2" bottom rail weighing 1.71 lbs./ft. (2.54 kg/m). Supply 2 truck assemblies that are swivel type having lubricated and scaled ball bearing wheels that will align in the track during all normal operations of the gate.

Standard Opening	Standard Support Overhang
11'-0" (3354 mm) through 14'-0" (4267 mm)	7'-6" (2286 mm)
15'-0" (4572 mm) through 22'-0" (6706 mm)	10'-0" (3048 mm)
23'-0" (7010 mm) through 30'-0" (9144 mm)	12'-0" (3857 mm)
31'-0" (9449 mm) through 40'-0" (12192 mm)	16'-0" (4876 mm)

B. Gate Overlay: Re-claimed cedar siding.

C. Gateposts, 4” O.D. (101.6 mm) schedule 40 weighing 9.11 lb/ft (13.6 kg/m). Single gates with single tracks require 3 gate posts. (1 latch post and 2 support posts) Single gates with dual tracks require 5 gate posts. (1 latch and 2 dual support posts) Double gates require twice the number of support posts but do not have a latch post.

D. Electrically operated horizontal slide gates must be manufactured and installed to comply with the safety requirements of ASTM F2200 and UL 325.

E. Gate frame uprights and diagonal bracing shall be pre-fabricated and pre-punched to accept frame fasteners. Enclosed track shall be pre-punched to accept gate uprights. Posts shall be precut to specified lengths.

F. Top and bottom enclosed track extrusions shall be mechanically fastened to vertical gate uprights and intermediate supports, as required by assembly instructions. Diagonal bracing shall be mechanically fastened to vertical gate uprights and intermediate supports, as required by assembly instructions. Reclaimed wood shall be attached to gate uprights with non-corrosive screws.

G. The manufactured gate components shall be galvanized.

2.7 TIE WIRE and HOG RINGS

A. Basic commercial / industrial applications - specify 9-gauge core aluminum alloy ties and hog rings per ASTM F626.
B. Added security or fence containing privacy slats specify 9-gauge core (0.148) (3.76 mm) steel Galvanized Before Weave (GBW) with preformed power fastened wire ties and preformed hog rings having minimum zinc coating 1.20 oz/ft² (366 g/m²) per ASTM F626.

2.8 CONCRETE

A. Concrete for post footings shall have a 28-day compressive strength of 2,500 psi. (17.2 MPa).

PART 3 EXECUTION

3.1 CLEARING FENCE LINE

Clearing: Surveying, clearing, grubbing, grading and removal of debris for the fence line or any required clear areas adjacent to the fence <Insert project requirement> [is included in the earthwork contractor's contract under the provisions of Division 31 - Earthwork.] [is not included in the earthwork contractor's contract and is the responsibility of the fence contractor in accordance with the provisions of Division 31 - Earthwork.] The contract drawings indicate the extent of the area to be cleared and grubbed.

3.2 FRAMEWORK INSTALLATION

A. Posts: Posts shall be set plumb in concrete footings in accordance with ASTM F567. Minimum footing depth, 24 in. (609.6 mm) plus an additional 3 in. (76.2 mm) depth for each 1 ft. (305 mm) increase in the fence height over 4 ft. (1220 mm). Minimum footing diameter four times the largest cross section of the post up to a 4.00" (101.6 mm) dimension and three times the largest cross section of post greater than a 4.00" (101.6 mm) dimension. Top of concrete footing to be at grade crowned to shed water away from the post. Line posts installed at intervals not exceeding 10 ft. (3.05 m) on center or as shown.

B. Top rail: When specified, install 21 ft. (6.4 m) lengths of rail continuous thru the line post or barb arm loop top. Splice rail using top rail sleeves minimum 6 in. (152 mm) long. Rail shall be secured to the terminal post by a brace band and rail end. Bottom rail or intermediate rail shall be field cut and secured to the line posts using boulevard clamps or brace band with rail end.

C. Terminal posts: End, corner, pull and gate posts shall be braced and trussed for fence 6 ft. (1.8 m) and higher and for fences 5 ft. (1.5 m) in height not having a top rail. The horizontal brace rail and diagonal truss rod shall be installed in accordance with ASTM F567.

D. Tension wire: Shall be installed 4 in. (101.6 mm) up from the bottom of the fabric. Fences without top rail shall have a tension wire installed 4 in. (101.6 mm) down from the top of the fabric. Tension wire to be stretched taut, independently and prior to the fabric, between the terminal posts and secured to the terminal post using a brace band. Secure the tension wire to each line post with a tie wire.

3.3 CHAIN LINK FABRIC INSTALLATION

Chain Link Fabric: Install fabric to [outside or inside] of the framework maintaining a ground clearance of no more than 2 inches (50 mm). Attach fabric to the terminal post by threading the tension bar through the fabric; secure the tension bar to the terminal post with tension bands and 5/16 in. (7.94 mm) carriage bolts spaced no greater than 12 inches (304.8mm) on center. Small mesh fabric less than 1 in. (25 mm), attach to terminal post by sandwiching the mesh between the post and a vertical 2 in. wide (50mm) by 3/16 in. (4.76 mm) galvanized steel strap using carriage bolts, bolted thru the bar, mesh and post spaced 15 in. (381 mm) on center. Chain link fabric to be stretched taut free of sag. Fabric to be secured to the line post with tie wires spaced no greater than 12 inches (304.8 mm) on center and to horizontal rail spaced no greater than18 inches (457.2 mm) on center. [Aluminum alloy tie wire shall be installed following ASTM F567: Wrap the tie around the post or rail and attached to a fabric wire picket on each side of the post or rail by twisting the tie wire around the fabric wire picket two full turns, cut off excess wire and bend over to prevent injury.] [Preformed 9-gauge power-fastened wire ties shall be installed following ASTM F626: Wrap the tie a full 360° around the post or rail and fabric wire picket, using a variable speed drill, twist the two ends together three full turns, cut off any excess wire and bend over to prevent injury.] Secure the fabric to the tension wire by crimping hogs rings around a fabric wire picket and tension wire.

3.5 GATE INSTALLATION

B. Horizontal Slide Gates: Install according to manufacturer's instructions and in accordance with ASTM F567. Gates shall be plum in the closed position, installed to slide with an initial pull force no greater than 40 lbs. (18.14 kg). Double gate drop bar receivers to be installed in a concrete footing as required by site conditions and codes. Ground clearance shall be 3 in. (76 mm), grade permitting. Electrically operated gate installation must conform to ASTM F2200 and UL 325.

3.6 NUTS AND BOLTS

Bolts: Carriage bolts used for fittings shall be installed with the head on the secure side of the fence. All bolts shall be peened over to prevent removal of the nut.

3.7 ELECTRICAL GROUNDING

Grounding: Grounding of the fence and gates is not the responsibility of the fence contractor and not included in the fencing scope of work for this contract. Grounding, when required, shall be specified and included in Contract Section 33 79 00 Site Grounding. A licensed electrical contractor shall install grounding when required.

END OF SECTION

SECTION 32 31 19
DECORATIVE FENCES AND GATES

PART 1 GENERAL

1.1 SUMMARY

A. Provide decorative fencing and gates.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Samples: Submit two representative samples of each material specified indicating visual characteristics and finish. Include range samples if variation of finish is anticipated.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 MATERIALS

A. Wood Fences and Gates:
   1. Manufacturers: Reclaimed cedar fencing from Jarmak or equal.
   2. Type: Commercial.
   3. Style: Custom.
   4. Finish: Sealer over weather-resistant cedar.
   5. Gates: Cantilevered type.

B. Gate Hardware:
   1. Manufacturers: Architectural Iron Designs, Inc..
   2. Type: Heavy duty hinges.
   3. Material: Galvanized steel.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install materials in accordance with manufacturer's instructions and approved submittals. Comply with ASTM F 567. Install materials in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections. Install posts to depth to avoid frost heave.

B. Cut pipe with pipe-cutters only. Cutting with backsaws is not acceptable. Tack weld gates for strength. Use spring loaded latches, not yokes.

C. Restore or replace damaged components. Clean and protect work from damage.

END OF SECTION

SECTION 32 90 00
PLANTING

PART 1 GENERAL

1.1 SUMMARY

A. Provide plantings.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

C. Maintenance Data: Submit maintenance data, including maintenance schedule.

D. Notices: Submit 48-hour written notice prior to turnover to Owner for watering and maintenance.

E. Warranty: Warrant trees and shrubs for a period of one year after date of Substantial Completion, against defects including death and unsatisfactory growth and except for defects resulting from neglect by Owner, abuse by others, or natural phenomena. Replace unsatisfactory plant material at end of warranty period at no additional expense to the Owner. One replacement is required.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. Balled and Burlapped Plants and Trees: Graded to American Standard for Nursery Stock, ANSI Z60.1.

C. Testing: Laboratory testing for suitable soil amendments and fertilizer.

PART 2 PRODUCTS

2.1 MATERIALS

A. Planting:
1. Manufacturers: CityScapes International Inc. or equal.
2. Application: Trees, shrubs, plants, and ground cover.
3. Application: Topsoil and soil amendments.
4. Application: Initial maintenance of landscape materials.
5. Application: Pruning and relocation of existing plant materials.
6. Plant Materials: Deciduous trees and shrubs.
7. Plant Materials: Coniferous trees and shrubs.
8. Plant Materials: Ground cover and plants.
9. Topsoil: Site stockpile and from offsite.
10. Soil Amendments: Based on soil testing.

11. Accessories:
    a. Gravel: Water-worn gravel.
    b. Anti-Erosion Mulch: Seed-free salt hay or threshed straw.
    c. Anti-Dessicant: Emulsion type, film-forming.
    d. Plastic Sheet: Black polyethylene, 8 mils.
    e. Filtration Fabric: Water permeable fiberglass or polypropylene fabric.
    f. Wrapping: Tree-wrap tape.
    g. Stakes and Guys: New hardwood, treated softwood, or redwood.
    h. Metal Edging: Commercial steel edging.
    i. Wood Headers and Edging: All heart redwood or pressure treated southern yellow pine.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install materials in accordance with approved submittals. Install landscape work in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections.

B. Prepare topsoil by mixing fertilizer with loam. Apply fertilizer at a rate of 2 pounds of actual nitrogen per 1000 sq. ft. for plant beds and 2 pounds per inch of trunk for tree pits.

C. Install soil mix to a depth of 18 inches in plant beds.

D. Excavate as required for trees and shrubs.

E. Install plant material and backfill with soil mix. Stake and guy trees. Water thoroughly. Allow for soil settlement.

F. Provide maintenance and watering until turnover to Owners for maintenance and watering. Replace damaged materials and dead or unhealthy plants prior to turnover to Owner.

END OF SECTION

SECTION 48 14 00
SOLAR ENERGY ELECTRICAL POWER GENERATION EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

1. Provide common work results for electrical systems.

1.2 SUBMITTALS

1. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

2. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction. Shop drawings shall be prepared and stamped by a qualified engineer licensed in the jurisdiction of the project.

3. Operation and Maintenance Data: Submit manufacturer's operation and maintenance data, including operating instructions, list of spare parts and maintenance schedule.

1.3 QUALITY ASSURANCE

1. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 MATERIALS

1. Photovoltaic Panels:

   a. Hyundai Solar Module, PI Series, 405-Watt, Mono-Crystalline, HiS-S400PI or Maxeon 3, Solar Panel, 405-Watt, Mono-Crystalline, SPR-MAX3-405-BLK-R.

2. PV Supports, and Aluminum Framework for Roof Application:
   1. Manufacturer: Opsun or equal.
   2. Material: Aluminum structure and components, stainless steel bolts & nuts.
   3. Max Snow Loads: Can be designed for any snow loads (up to over 100 PSF).
   4. Max Wind Loads: Can be designed for any wind loads (up to 180 MPH).
   5. Tilt Angle: 10 to 30 (15 typical).
   6. PV Panel Orientation: Landscape
   7. Module: Any framed PV, any frameless PV.
   8. Water Management: Water managed with rubber gaskets.
   9. PV Panel Height from Ground: Customizable, 12 to 14.5 feet.
   10. Grounding: Self-bonding PV clamps, UL 2703 listed.

PART 3 INSTALLATION

1. Configuration: Dual rows with back-to-back configuration. 100% aluminum structure, super light, all parts can be manipulated by hand. Can be assembled without heavy machinery. Grounding shall be self-bonding PV clamps, UL 2703 listed. Typical bifacial gains shall be 10-20% (depending on location and orientation).

END OF SECTION