Exterior Improvements to:

1-3 Thomas Street
Rochester, NY 14605

ROCHESTER
Housing Authority

675 West Main Street
Rochester, NY 14611

Architect's Project No. 52-23

January 11, 2024

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SECTION 011000

SUMMARY OF THE WORK

1.01 GENERAL

1.02 RELATED DOCUMENTS

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

1.03 SUMMARY

A. This Section includes the following:

1. Work covered by the Contract Documents.
2. Type of the Contract.
3. Work phases.
4. Work under other contracts.
5. Products ordered in advance.
6. Use of premises.
7. Owner's occupancy requirements.
8. Work restrictions.
9. Specification formats and conventions.

1.04 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification:

10. Project Location: Owner: Rochester Housing Authority

11. Project Location: 1-3 Thomas St., Rochester, NY 14605

12. Owner's Representative: James Senger – Project Manager, RHA.

B. Architect: Peter L. Morse & Associates – Architects AIA

C. In paragraph and first subparagraph below, include an abbreviated summary of the Work for Project described above. See Evaluations.

D. The Work consists of the following:
1. The Work includes
   a. Complete exterior remodel work of siding, roofing and new construction of decks and roof overframing, porches per specs, with preservation of existing incoming electrical, plumbing, with modifications for new connections as noted on plans.
   b. Complete removal of exterior items such as roofing, siding, windows, porch, and deck.
   c. New composite front porch with aluminum handrails, and Aluminum yard fence.
   d. New site Dumpster Enclosure and Landscaping.

e. New driveway sealing.
f. New striping of driveway.

1.2 TYPE OF CONTRACT

A. Project will be constructed under a single contract. Electrical work is included.

1. Construction with all new electrical and data system services are included in this project. Contact person for electrical work is
   a. Picard Engineering – Mark Picard PE 3159 Winton Rd. South Ste 207 Rochester, NY 14623.
   b. Phone/ email (585) 292-6060 Ext 111, or (585) 734-7648.

1.3 WORK PHASES

A. Before commencing Work of each phase, submit a schedule showing the sequence, commencement and completion dates, and completion dates for RHA personnel for all phases of the Work.

1.4 WORK UNDER OTHER CONTRACTS

A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract. Coordinate the Work of this Contract with work performed under separate contracts.

1.5 USE OF PREMISES

A. General: Contractor shall have full use of premises for construction operations, including use of Project site, during construction period. Contractor's use of premises is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

B. Use of Site: Limit use of premises to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Limits: Confine constructions operations to fifty feet around the perimeter of the work area.

2. Owner Occupancy: RHA's Residents are to remain in their homes while work is commencing and RHA and the Architect's representative will need access for inspection of Project site. They will need safe passage in and out of their homes. Keep general public away from the Project site by securing the site with temporary fencing.

3. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

    a. Schedule deliveries to minimize use of driveways and entrances.

    b. Provide RHA with a sketch of staging areas prior to commencement of the work.

C. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.6 OWNER'S OCCUPANCY REQUIREMENTS

A. Full Owner Occupancy: RHA residents will occupy their homes during construction has been completed and to the satisfaction of the staff. Cooperate with RHA during construction operations for inspections of the work. Make safe passage for Residents to enter their Townhouses.

1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from RHA and authorities having jurisdiction.
2. Provide not less than 24 hours' notice to RHA of activities that will affect RHA operations.

B. Subparagraphs below describe procedures and requirements necessary before partial occupancy of portions of Project.

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

1.7 WORK RESTRICTIONS

A. On-Site Work Hours: Work shall be generally performed inside the existing building during normal business working hours of 7 a.m. to 5 p.m., Monday through Friday except otherwise indicated.

1. Weekend Hours: With RHA approval.
2. Early Morning Hours: 7 am.
3. Hours for Utility Shutdowns: as necessary.

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

1. Notify the RHA representative not less than four days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without their written permission.

1.8 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Format: The Specifications are organized into Divisions and Sections using the 16-division format and CSI/CSC's "MasterFormat" numbering system.

1. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.
2. Division 1: Section 1 in Division 1 govern the execution of the Work of all Sections in the Specifications.

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

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.

a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

1.9 MISCELLANEOUS PROVISIONS

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

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

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
   1. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
   2. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
   3. Specific test and inspection requirements are not specified in this Section.

1.2 DEFINITIONS

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

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

C. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

D. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

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

F. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
   1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

G. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project;

being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.3 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.4 REPORTS AND DOCUMENTS

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

B. Manufacturer's Field Reports: Prepare written information documenting tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
4. Results of operational and other tests and a statement of whether observed performance complies with requirements.
5. Other required items indicated in individual Specification Sections.

C. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee

payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.5 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

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

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

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

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

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
   1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
   1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
   2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

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

I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
   1. Contractor responsibilities include the following:
      a. Provide test specimens representative of proposed products and construction.

b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
c. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
d. When testing is complete, remove test specimens, assemblies, and mockups; do not reuse products on Project.

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

1.6 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a manufacturer's representative to observe and inspect the Work. Manufacturer's representative's services include examination of substrates and conditions, verification of materials, inspection of completed portions of the Work, and submittal of written reports.

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

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

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

F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.7 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Owner will engage a qualified testing agency and special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:
1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)
PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
   1. Date test or inspection was conducted.
   2. Description of the Work tested or inspected.
   3. Date test or inspection results were transmitted to Architect.
   4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
   1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."

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

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

END OF SECTION 014000

SECTION 016000

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

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

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

1.3 ACTION SUBMITTALS

A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
   1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
      a. Form of Approval: As specified in Section 013300 "Submittal Procedures."
      b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

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

SECTION 016000

PRODUCT REQUIREMENTS

1.4 QUALITY ASSURANCE

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

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

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

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

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

1.6 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
   1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
   2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
   1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.

2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. Refer to other Sections for specific content requirements and particular requirements for submitting special warranties.

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

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

B. Product Selection Procedures:
1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
3. Products:
    a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.
    b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
4. Manufacturers:
    a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.

b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.

5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

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

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

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

2.2 COMPARABLE PRODUCTS

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

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

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 017300

EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
   1. Construction layout.
   2. Installation of the Work.
   3. Progress cleaning.
   4. Starting and adjusting.
   5. Protection of installed construction.
   6. Correction of the Work.

1.2 INFORMATIONAL SUBMITTALS

A. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.

B. Certified Surveys: Submit two copies signed by land surveyor.

1.3 QUALITY ASSURANCE

A. Land Surveyor Qualifications: If required, a professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, and other construction affecting the Work.
   1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
   2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
   1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
   2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
   3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility to Moziac that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
   1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
   2. Establish limits on use of Project site.
   3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
   4. Inform installers of lines and levels to which they must comply.
   5. Check the location, level and plumb, of every major element as the Work progresses.

6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

3.4 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and

items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.5 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
   1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
   2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
   3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
   1. Remove liquid spills promptly.
   2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.6 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements"

3.7 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION

SECTION 017329

CUTTING AND PATCHING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Contractor and their subcontractors shall be responsible for doing his own cutting and patching
B. Execute cutting, fitting or patching work as required to:
    1. Make several parts fit properly.
    2. Uncover work to provide for installation of ill-timed work.
    3. Remove and replace defective work
    4. Remove and replace work not conforming to requirements of Contract Documents.
    5. Remove samples of installed work as specified for testing.
    6. Install specified work in existing construction.
    7. Removed sample to verify existing conditions and or materials to be replaced.
C. In addition to Contract Requirements, upon written instructions of Architect:
    1. Uncover work to provide for Architect's observation of covered work.
    2. Remove samples of installed materials for testing.
    3. Remove work to provide for alteration of existing work.
D. Do not endanger any work by cutting or altering work or any part of it.
E. Do not cut, or alter work of another contractor, or subcontractor without permission of said contractor or written consent or architect, or unless otherwise noted in the contract documents.

1.02 SUBMITTALS

A. Prior to cutting which affects structural safety or Project or work of another contractor, submit written notice to architect requesting consent to proceed with cutting, including:
    1. Identification of Project
    2. Description of affected work.
    3. Necessary for cutting.
    4. Affect on other work, on structural integrity of Project.
    5. Description of proposed work; designate:
        a. Scope of cutting and patching.
        b. Products proposed to be used.
        c. Extent of refinishing.

B. Prior to cutting and patching done on instruction of architect, submit cost estimate if work in not a part of the contract agreement.

PART 2 - PRODUCTS

2.01 MATERIALS

A. For replacement of work removed, comply with specifications for type of work to be done.
B. Where no materials for replacement are specified, submit to architect written notice of similar and/or compatible material which contractor intends to use for approval prior to commencement of the work.

SECTION 017329

CUTTING AND PATCHING

PART 3 - EXECUTION

3.01 INSPECTION

A. Inspect existing conditions of work, including elements subject to movement or damage during cutting and patching.
B. After uncovering work, inspect conditions affecting installation of new products.

3.02 PREPARATION

A. Prior to cutting:
   1. Provide shoring, bracing, and support as required to maintain structural integrity of project.
   2. Provide protection for other portions of the project.
   3. Provide protection from the elements.

3.03 PERFORMANCE

A. Execute fitting and adjustment of products to provide finished installation to comply with specified tolerances and finishes.
B. Execute cutting and demolition by methods which will prevent damage to other work and will provide proper surfaces to receive installation of repairs and new work.
C. Restore work which has been cut or removed; install new products to provide complete work in accordance with requirements of Contract Documents.
D. Refinish entire surfaces; to the nearest intersections.

END OF SECTION

SECTION 017700

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

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

1. Inspection procedures.
2. Warranties.
3. Final cleaning.

1.3 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Advise Owner of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Obtain and submit releases permitting RHA unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs damage or settlement surveys, property surveys, and similar final record information.
6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
7. Make final changeover of permanent locks and deliver keys to RHA.
   Advise RHA personnel of changeover in security provisions.
8. Complete startup testing of systems.
9. Submit test/adjust/balance records.
10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.

11. Submit changeover information related to RHA's occupancy, use, operation, and maintenance.
12. Complete final cleaning requirements, including touchup painting.
13. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

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

1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to Division 1 Section "Payment Procedures."
2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, the Contractor, RHA or the Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

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

SECTION 017700

CONTRACT CLOSEOUT

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order,
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:

    a. Project name.
    b. Date.
    c. Name of Architect
    d. Name of Contractor.
    e. Page number.

1.6 WARRANTIES

A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

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

C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

D. Provide additional copies of each warranty to include in operation and maintenance manuals.

SECTION 017700

CONTRACT CLOSEOUT

PART 2 - PRODUCTS

2.1 MATERIALS

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

PART 3 - EXECUTION

3.1 FINAL CLEANING

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

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

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

    a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    g. Sweep concrete floors broom clean in unoccupied spaces.
    h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.

i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
j. Remove labels that are not permanent.
k. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

    1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

l. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
m. Replace parts subject to unusual operating conditions.
n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
p. Clean ducts, blowers, and coils if units were operated without filters during construction.
q. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
r. Leave Project clean and ready for occupancy.

C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION

SECTION 017839

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:
   1. Record Drawings.
   2. Record Specifications.
   3. Record Product Data.

1.2 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:
   1. Number of Copies: Submit copies of record Drawings as follows:
      a. Submit PDF electronic files of scanned record prints and three set(s) of paper prints.

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

C. Record Product Data: Submit PDF electronic files of scanned record product data and one set of paper copy.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised Drawings as modifications are issued.
   1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
      a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
      b. Record data as soon as possible after obtaining it.
      c. Record and check the markup before enclosing concealed installations.
   2. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
   3. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
   4. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
   1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
   2. Identification: As follows:
      a. Project name.
      b. Date.
      c. Designation "PROJECT RECORD DRAWINGS."
      d. Name of Architect.
      e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
   1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
   2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
   3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
   4. Note related Change Orders, record Product Data, and record Drawings where applicable.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
   1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
   2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
   3. Note related Change Orders, record Specifications, and record Drawings where applicable.

2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

END OF SECTION 017839

SELECTIVE DEMOLITION

SECTION 024119

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. RHA's Property Report regarding Pre-Renovation Hazardous Materials Report for reference for Mold Remediation.

1.2 SUMMARY

A. Selective demolition which meets the certification goals as established by the Rochester Housing Authority Program for the individual Project requirements, of the following types.

B. Section Includes:

1. Demolition and removal of selected portions of building. Demolition includes the specifically the following items.
   a. Remove all siding, roofing, roof sheathing, windows, doors, and exterior metal trim
   b. Remove all porch flooring throughout the work area noted.
   c. Remove all exterior light fixtures.
   d. Remove all noted wiring and electrical devices. (See Electrical Specs)
2. Salvage of existing items noted to be reused or recycled.
3. Protecting existing work to remain.
4. Cleaning soiled materials that are to remain.
5. Disconnecting and capping utilities.
6. Removing debris and equipment.
7. Removal of items indicated on Drawings.
8. Salvageable items to be retained by the Rochester Housing Authority as indicated on the Drawings and during the pre-construction job walk.

C. Related Requirements:

1. Section 011000 "Summary of the Work" for restrictions on the use of the premises, Owner-occupancy requirements, and phasing requirements.
2. Section 017329 " Cutting and Patching "procedures.
3. Section 033000: Concrete

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent

damage, and deliver to RHA.

C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Ownership of Materials: Except for items or materials indicated to be reused, salvaged, or otherwise indicated to remain RHA's property, demolished materials shall become the Contractor's property and shall be removed from the site with further disposing at the Contractor's option.

1.5 INFORMATIONAL SUBMITTALS

A. Proposed Protection Measures: Submit report, including drawings if required, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and , for noise control. Indicate proposed locations and construction of barriers.

B. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's, staff, and clientele on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Use of elevator and stairs.
5. Coordination of RHA's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

C. Inventory: Submit a list of items to be removed and salvaged and deliver to Owner prior to start of demolition.

D. Pre-demolition Photographs (or Video): Submit before Work begins. (Required).

E. Warranties: Documentation indicated that existing warranties are still in effect after completion of selective demolition.

1.6 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

B. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.7 QUALITY ASSURANCE

A. Carefully perform demolition work, by skilled workers experienced in building demolition procedures, using appropriate tools and equipment. Perform work, at all times, under the direct supervision of a supervisor approved by RHA's Project Manager.

B. Coordinate demolition with other trades to ensure correct sequence, limits, and methods of proposed demolitions. Schedule work to create least possible inconvenience to the public and to facility operations.

1.8 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties. Notify warrantor before proceeding. Existing warranties include the following:

B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

PART 2 - PRODUCTS

2.1 PEFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Review record documents of existing construction provided by RHA and the Architect does not guarantee that existing conditions are same as those indicated in record documents.

C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict.

Promptly submit a written report to Architect.

E. Survey of Existing Conditions: Record existing conditions by use of measured drawings.

3.2 GENERAL

A. Protection:
1. Do not begin demolition until safety partitions, barricades, warning signs and other forms of protection are installed.
2. Provide safeguards, including warning signs, lights and barricades, for protection of occupants and the general public during demolition.
3. Provide and maintain fire extinguishers onsite. Comply with requirements of governing authorities.
4. Maintain existing utilities which are to remain in service and project from damage during operations.

B. Safety: If at any time safety of existing construction appears to be endangered, take immediate measures to correct such conditions; cease operations and immediately notify the Owner Inspector. Do not resume demolition until directed by RHA's Inspector.

C. Dust Control: Use water mist, temporary enclosures, and other suitable methods to limit the spread of dust and dirt. Comply with governing environmental protection regulations. Do not create hazardous or objectionable conditions, such as flooding and pollution, when using water.

D. Debris Removal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grades level.

E. Progress Cleaning: Clean adjacent buildings and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing before start of demolition.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/ systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

3.4 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Comply with requirements for access and protection specified in Section 015000

"Temporary Facilities and Controls."

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

3.5 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations.

B. Removed and Salvaged Items:

1. Clean salvaged item that are noted for salvage.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Contractor.
4. Transport items to RHA's storage area designated by RHA.
5. Protect items from damage during transport and storage.

C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by RHA items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.

B. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

C. Resilient Floor Coverings/ carpeting: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.

D. Drywall. Remove existing drywall in the entire residence.

E. Doors and Windows: Remove all windows and exterior doors. Secure the site at the end of the day. Install new doors and windows same day.

F. Electric: Inspect existing house power panel. All outlets affected work in the residence both existing and new shall be removed in the existing residence per Electrical Specs.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off RHA's property and legally dispose of them

3.8 PATCHING AND RESTORATION

A. Patching: Where removals leave holes and damaged surfaces that will be exposed in the completed construction, such holes and damaged surfaces shall be patched and resorted to match adjacent finished surfaces.

B. Restoration of Building Finishes: Touch up scratched finishes as recommended by manufacturer of original finish.

C. Restoration of Site Finishes at interior.
   1. Restore any broken concrete slabs.

3.9 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION

SECTION 024200

DISPOSAL OF NON- HAZARDOUS WASTE

PART 1 GENERAL

1.01 REFERENCES

A. Remove, and dispose of the materials in accordance with all applicable local and state governmental agency codes, rules, and regulations.

1.02 DESCRIPTION

A. Removal of all construction debris materials from the work area on a daily basis.
B. Remove construction debris via Dumpster/ Roll off on a weekly basis.

1.03 SUBMITTALS

A. Detailed step by step procedure indicating how the Work is to be accomplished.

1.04 QUALITY ASSURANCE

A. Before the Work of this Section is scheduled to commence an RHA Representative shall discuss and review the Work procedures.

1.05 PROJECT CONDITIONS

A. Environmental Requirements:
   1. Comply with all applicable governmental agency codes, rules, and regulations for handling non-hazardous industrial, commercial and non-industrial waste.

END OF SECTION

SECTION 033000

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
   1. Cutting and infilling existing stoops, sidewalks, slabs-on-grade and concrete steps
   2. Installing new concrete piers for deck and porch posts.
   3. Installing new concrete dumpster pad and "Bump Stop" within the enclosure.

1.3 DEFINITIONS

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

1.4 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each of the following, signed by manufacturers:
   1. Cementitious materials.
   2. Accessories.

1.5 QUALITY ASSURANCE

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

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

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

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
   1. Portland Cement: ASTM C 150, Type I,. Supplement with the following:
      a. Fly Ash: ASTM C 618, Class F or C.

B. Normal-Weight Aggregates: ASTM C 33, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years'

satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.

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

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

2.3 CONCRETE MIXTURES, GENERAL

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

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

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

1. Fly Ash: 25 percent.

2.4 CONCRETE MIXTURES FOR BUILDING ELEMENTS

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

1. Minimum Compressive Strength: 4,000 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.45.
3. Slump Limit: 4 inches, plus or minus 1 inch.
4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.
5. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

2.5 CONCRETE MIXING (FOR CONCRETE TRENCHING AND PATCHING)

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

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

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301

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

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

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

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

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

3.2 JOINTS

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

B. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
   1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
   2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

3.3 CONCRETE PLACEMENT

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

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

3.4 FINISHING WALKS FLOORS AND CONCRETE SLABS

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

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

C. Broom Finish: Apply a broom finish to exterior concrete slabs, steps, ramps, and elsewhere as indicated.
   1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

D. Metal Trowel Finish: Concrete Dumpster Pad.

3.5 CONCRETE PROTECTING AND CURING

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

3.6 FIELD QUALITY CONTROL

A. Inspect concrete for final acceptance. Floor patch must be flush with surrounding concrete.

END OF SECTION

SECTION 055200

ALUMINUM HANDRAILS AND RAILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Division 01 - General Requirements, and other applicable specification sections in the Project Manual apply to the work specified in this Section.

1.2 SUMMARY

A. Scope: Provide labor, material, equipment, related services, and supervision required, including, but not limited to, manufacturing, fabrication, erection, and installation for aluminum handrails and railings as required for the complete performance of the work, and as shown on the Drawings and as herein specified.

B. Section Includes: The work specified in this Section includes, but shall not be limited to, the following:

1. Aluminum exterior handrails.
2. Aluminum porch railings.

C. Related Sections:
1. Section 062000 – Finish Carpentry.

1.3 REFERENCES

A. General: The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by the basic designation only. The edition/revision of the referenced publications shall be the latest date as of the date of the Contract Documents, unless otherwise specified.

B. Aluminum Association, Inc. (AA):
1. AA SAS-30, "Specifications for Aluminum Structures."

C. American Architectural Manufacturers Association (AAMA):
1. AAMA 611, "Voluntary Specifications for Anodized Architectural Aluminum (Revised)."
2. AAMA 2604, "Voluntary Specification, Performance Requirements, and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels."

D. American Welding Society (AWS):
1. AWS D1.2, "Structural Welding Code – Aluminum."

E. ASTM International (ASTM):
1. ASTM B26/B26M,"Standard Specification for Aluminum-Alloy Sand Castings."
2. ASTM B209/B209M,"Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate."

3. ASTM B210/B210M, “Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes.”
4. ASTM B221/B221M, “Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.”
5. ASTM B247/B247M, “Standard Specification for Aluminum and Aluminum-Alloy Die Forgings, Hand Forgings, and Rolled Ring Forgings.”
6. ASTM B429/B429M, “Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.”

F. Code of Federal Regulation (CFR):
1. 16 CFR Part 1201, "Safety Standard for Architectural Glazing Material" (Consumer Products Safety Commission).

G. National Association of Architectural Metal Manufacturers (NAAMM):
1. NAAMM MFM, "Metal Finishes Manual."

1.4 DEFINITIONS

A. See definitions in ASTM E985 for railing-related terms that apply to this Section.

1.5 PERFORMANCE REQUIREMENTS

A. General: Handrails and railings shall withstand structural loading as determined by allowable design working stresses of materials based on the following standards.
1. Aluminum: AA SAS-30.

B. Structural Performance: Provide handrails and railings capable of withstanding the following structural loads without exceeding allowable design working stress of materials for handrails, railings, anchors, and connections:
1. Top Rail: Shall withstand the following loads:
   a. Concentrated load of 200 lbf (890 N) applied at any point and in any direction.
   b. Uniform load of 50 lbf per foot (730 N/m) applied horizontally or vertically downward.
   c. Concentrated and uniform loads above need not be assumed to act concurrently.
2. Handrails not Serving as Top Rails: Shall withstanding the following loads:
   a. Concentrated load of 200 lbf (890 N) applied at any point and in any direction.
   b. Uniform load of 50 lbf per foot (730 N/m) applied in any direction.
   c. Concentrated and uniform loads above need not be assumed to act concurrently.
3. Guard Infill Area: Shall withstand the following loads:
   d. Concentrated horizontal load of 50 lbf (222 N) applied to 1 square foot (0.09 m^2) at any point in system, including panels, intermediate rails, balusters, or other elements composing infill area. Loads need not be assumed to act concurrently with loads on top rails in determining stress on guard.
   e. Pickets shall be spaced no more than 4”apart.

C. Thermal Movements: Handrails and railings shall allow for movements resulting from 120 degree F (49 degree C) changes in ambient and 180 degree F (82 degree C) surface temperatures. Base

engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

D. Corrosion Resistance: Separate incompatible materials to prevent galvanic corrosion.

1.6 SUBMITTALS

A. General: Submit under provisions of Section 01 33 00 - Submittal Procedures.

B. Product Data:
   1. Submit manufacturer's data sheets on each product to be used, including, but not limited to, the following:
      a. Preparation instructions and recommendations.
      b. Storage and handling requirements and recommendations.
      c. Installation methods.
   2. Submit product data for manufacturers product lines of handrails and railings assembled from standard components, including, but not limited to, the following:
      a. Grout, anchoring cements and paint products.

C. Shop Drawings: Submit shop drawings showing fabrication and installation of handrails and railings. Include plans, elevations, sections, details, and attachments to other work.

D. Samples:
   1. Color Selection: Submit manufacturer's color charts showing the full range of colors available for products with factory-applied color finishes.
      a. Finish Selection: Provide sections of railing or flat sheet metal which depict available mechanical surface finishes.
      b. Color: Black.

E. Quality Control Submittals:
   1. Design Data: For installed handrails and railing systems indicated to comply with certain design loadings, include structural analysis data signed and sealed by the professional engineer who was responsible for their preparation.

1.7 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer Qualifications: Manufacturer shall be a firm engaged in the manufacture of aluminum handrails and railings of types and sizes required, and whose products have been in satisfactory use in similar service for a minimum of 15 years.

B. Regulatory Requirements: Comply with applicable requirements of the laws, codes, ordinances, and regulations of Federal, State, and local authorities having jurisdiction. Obtain necessary approvals from such authorities.

C. Single Source Responsibility: Obtain aluminum handrails and railings from a single source with resources to produce products of consistent quality in appearance and physical properties without delaying the work.

1.8 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.

1.9 PROJECT CONDITIONS

A. Environmental Requirements: 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.

1.10 WARRANTY

A. General: See Section 0177 00 - Closeout Procedures.

B. Warranty: Provide manufacturer's standard form outlining the terms and conditions of their Standard Limited Warranty:
   1. Surface Finish Warranty: One-year limited warranty.
   2. Material Integrity Warranty: One year limited warranty.

C. Additional Owner Rights: The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

1.11 EXTRA MATERIALS

A. All supplemental materials not expressly specified in this section shall be approved by the Architect prior to installation.
   1. Provide 6 additional Pickets for attic storage.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Items specified are to establish a standard of quality for design, function, materials, and appearance. Equivalent products by other manufacturers are acceptable. The Architect will be the sole judge of the basis of what is equivalent.

SECTION 055200

ALUMINUM HANDRAILS AND RAILINGS

2.2 MATERIALS

A. Aluminum
   1. Architectural railings spindles and posts.

B. Basis of Design:, Equal to:
   1. Color Guard Railing Systems. ColorGuardRailing.Com.
   2. Provide all matching aluminum accessories from manufacturer for all post and base attachment.
      a. Lincoln Series. – 36" overall height.
      b. ¾" Square Pickets with system top rail.
      c. Color: Black.

C. Provide all connectors for mounting hardware for all parts.
   1. Provide base assembly and internal mounting bracket.
   2. Swivel brackets for handrail connections at posts.

D. Metals: Provide metal free from pitting, seam marks, roller marks, stains, discolorations, and other imperfections where exposed to view on finished units.
   1. Aluminum: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than strength and durability properties of alloy and temper designated below for each aluminum form required.
      a. Extruded Bar and Tube: ASTM B221/B221M, Alloy 6063-T5/T52.
      b. Extruded Structural Pipe and Tube: ASTM B429/B429M, Alloy 6063-T832.
      c. Drawn Seamless Tube: ASTM B210/B210M, Alloy 6063-T832.
      d. Plate and Sheet: ASTM B209/B209M, Alloy 6061-T6.
      e. Die and Hand Forgings: ASTM B247/B247M, Alloy 6061-T6.
      f. Castings: ASTM B26/B26M, Alloy A356-T6.
   2. Brackets, Flanges, and Anchors: Provide cast or formed metal of same type of material and finish as supported rails, unless otherwise indicated.
      a. Provide manufacturers brackets with flange tapped for concealed anchorage to threaded hanger bolt.
      b. Provide formed or cast brackets with predrilled hole for exposed bolt anchorage.
      c. Provide formed steel brackets with predrilled hole for bolted anchorage and with snap-on cover that matches rail finish and conceals bracket base and bolt head.
      d. Provide brackets with interlocking pieces that conceal anchorage. Locate set screws on bottom of bracket.

E. Railing Components:
   1. Extruded Aluminum Components: Provide manufacturer's standard extruded aluminum components as follows: See manufacturer's standards.
      a. Standard Post: 2.376 inches by 2.376 inches with radiused corner, 0.100 inch wall thickness.
      b. Bottom Rail: 1.6926 inches high by 1.676 inches wide with a 0.765 inch wide pocket on the top and an open bottom.
      c. Picket: 1-1/2" inch square with (1.57 mm) wall thickness.
      d. Top Rail: as indicated on the Drawings and in the specifications or, if not indicated, as selected by the Architect from the manufacturer's standards with an open bottom, 0.0866 inch (2.20 mm) wall thickness.

F. Fasteners:
   1. Handrail Anchors: Select fasteners of type, grade and class required to produce connections suitable for anchoring handrails and railings to other types of construction indicated and capable of withstanding design loads.
   2. Handrail and Railing Component Anchors: Use fasteners fabricated from same basic metal, unless otherwise indicated. Do not use metals that are corrosive or incompatible with materials joined.
      a. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless exposed fasteners are unavoidable or are standard fastening method for handrail and railing indicated.
      b. Provide Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated.
      a. Cast-in-Place and Post Installed Anchors: Provide anchors of type indicated below, fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four items the load imposed when installed in concrete, as determined by testing per ASTM E488 conducted by a qualified independent testing agency.
      b. Chemical anchors.
      c. Expansion anchors.

2.3 FABRICATION

A. Assemble handrails and railings in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

B. Form changes in direction of railing members as shown on the Drawings.

C. Fabricate handrails and railings by connecting members with railing manufacturer's standard concealed mechanical fasteners and fittings, unless otherwise indicated. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

D. Provide manufacturer's standard wall brackets, flanges, miscellaneous fittings, and anchors to connect handrail and railing members to other construction.

E. Provide inserts and other anchorage devices to connect handrails and railings to concrete or masonry. Fabricate anchorage devices capable of withstanding loads imposed by handrails and railings. Coordinate anchorage devices with supporting structure.

F. Shear and punch metals cleanly and accurately. Remove burrs from exposed cut edges.

G. Cut, reinforce, drill, and tap components as indicated on the Drawings to receive finish hardware, screws, and similar items.

H. Close exposed ends of railing members with prefabricated end fittings.

I. Provide mounted handrail wall returns at wall ends unless otherwise indicated. Close ends of returns, unless clearance between end of railing and wall is 1/4 inch (6 mm) or less.

2.4 FINISHES

A. General: Comply with NAAMM MFM for recommendations for applying and designating finishes.
   1. Appearance of Finished Work:
      a. Variations in appearance of abutting or adjacent units are acceptable if they are within one-half of the range of final samples. Noticeable variations in the same unit are not acceptable.
      b. Variations in appearance of other components are acceptable if they are within the range of final samples and are assembled or installed to minimize contrast.

B. Aluminum Finish: Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

   1. Powder Coat Finish: AA-C12-C42-R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply manufacturer's standard baked powder coat finish. Comply with coating manufacturer's written instructions for cleaning, surface preparation, pretreatment, and application.
      1) Color: Satin Anodized.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine areas and conditions under which the work is to be installed, and notify the Contractor in writing, with a copy to the Owner and the Architect, of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.
   1. Examine substrates to receive anchors verifying that locations of concealed reinforcements have been clearly marked for the Installer. Locate reinforcements and mark locations if not already done.
   2. Beginning of the work shall indicate acceptance of the areas and conditions as satisfactory by the Installer.

3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installing anchors, such as sleeves, concrete inserts, anchor bolts, and miscellaneous items having integral anchors, that

are to be embedded in concrete or masonry construction. Coordinate delivery of such items to the Project site.

3.3 INSTALLATION

A. General:
   1. Fitting: Fit exposed connections together to form tight, hairline joints.
   2. Cutting and Placement: Set handrails and railings accurately in location, alignment, and elevation measured from established lines and levels and free from rack.
      a. Do not weld, cut, or abrade coated or finished surfaces of railing components that are intended for field connection by mechanical or other means without further cutting or fitting.
      b. Align rails so variations from level or parallel alignment do not exceed 1/4 inch in 12 feet (1.6 mm per m).
         1) Cover anchorage joint with a round steel flange attached to post by set screws.
         2) Leave anchorage joint exposed, wipe off surplus anchoring material, and leave 1/8 inch (3 mm) buildup, sloped away from post.
   3. Corrosion Protection: Provide separation as recommended by manufacturer on concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals.
   4. Adjusting: Adjust handrails and railings before anchoring to ensure alignment at abutting joint's space posts at interval indicated, but not less than required to achieve structural loads.
   5. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing handrails and railings and for properly transferring loads to in-place construction.

B. Non-Welded Railings Connections: Use mechanical joints for permanently connecting railing components. Use wood blocks and padding to prevent damage to railing members and fittings.

3.4 ADJUSTING AND CLEANING

A. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and appoint exposed areas with same material.

B. Cleaning: Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in field to shop; make required alterations and refinish entire unit, or provide new units.

3.5 PROTECTION

A. Provide final protection and maintain conditions in a manner acceptable to the Installer, that shall ensure that the aluminum handrails and railings shall be without damage at time of Substantial Completion.

B. Protect finishes of handrails and railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at the time of Substantial Completion.

END OF SECTION

SECTION 057800

ALUMINUM YARD FENCE

PART 1 GENERAL

A. Provide Yard fencing along Thomas St. and Upper Falls Blvd. as shown.

B. Provide matching fencing between the Northern Townhouse and neighbor's chain link fence on the North side of the site, as indicated.

1.01 SUBMITTALS

A. Shop Drawings: Show application to project. Machine duplicated copies of Contract Drawings will not be accepted.

B. Product Information:
   1. Provide a full catalog description of the product.

C. Quality Control:
   1. Provide written certification of the Aluminum and finish used in the fencing system.

1.02 DELIVERY, STORAGE, AND HANDLING

A. Deliver fence and gate components fully wrapped in protective plastic. Stack components in accordance with manufacturer's printed recommendations.

PART 2 PRODUCTS

2.01 MATERIALS

A. Aluminum Components:

B. Fence Style: pickets and two top rails.

C. Posts: Minimum 4 inches square aluminum with plain square post caps.

D. Bracing: Bracing shall be internal and not visible from either side of the fence structure. Place posts 24" in ground. Attach to side walls of Townhouses with manufacturers' mounting bracket.

E. Concrete base: Provide 2 to 4 percent air entrained Portland cement concrete with minimum compressive strength of 4000 psi at 28 days.

SECTION 057800

ALUMINUM YARD FENCE

2.02 FENCE MANUFACTURER.

A. Approved manufacturer of yard fence equal to:

a. FenceDepot.com. www.fence-depot.com. Pre-finished Aluminum-fence.

b. Style: Auburn Residential Aluminum Fence.

c. Features

1. Height: 60 inches
2. Width: 72 inch panels
3. Number of Horizontal Rails: 3 Rail
4. Horizontal Rail Size: 1 Inch Square
5. Vertical Picket Size: 5/8 Inch Square
6. Vertical Picket Spacing: 3 7/8 Inches
7. Rackability: 16 Inches Over 6 Foot Span
8. Warranty: Lifetime Warranty
9. Color: Black

B. Approved equal.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install the Work of this Section in accordance with the manufacturer's printed installation instructions, and as shown on the structural design shop drawings, and details shown on the Contract Drawing.

B. Install posts 24" in ground. Set in concrete.

END OF SECTION

SECTION 061000

ROUGH CARPENTRY

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. Framing with dimension lumber.
   2. Deck and porch framing with steps.
   3. Wood blocking and nailers for siding and trim.
   4. OSB floor sheathing.

1.3 FRAMING LUMBER:

A. AWPA Hem-fir # 2 grade or better. Exterior walls are 2 x 6 studs at 16"o.c. Bottom plate shall be pressure treated on continuous sill sealer.

1. Provide 2" x 2" wood cross bracing at new and deck floor joists.

2. Provide Louisiana Pacific LVL glue laminated beams where indicated on plans.

3. Replacement Roof Rafters: 2 x 10's at 24" o.c. with 2 x 8 collar ties at 4'-0".

4. Hurricane Connectors: H1 Simpson Strong Tie. One per rafter.

5. ¼ " luan sub-flooring for all floors. Glued and nailed.

6. New Roof sheathing: 7/16 " CDX OSB Board. Provide ply-clips at non-supported areas of sheathing. Apply to entire roof.
   a. Specialty wood products: LP Smart Side exterior trim boards, and with solid sheets for all fascia, window, and soffit. Paint all surfaces to match windows.

PART 2 - EXTERIOR DECK/ STOOP CARPENTRY

A. Provide AWPA Wolmanized UC4A pressure treated lumber for all structural lumber for deck, and steps. (Non-ground contact rated PT lumber.) posts shall be 6 x 6 nominal. Notch for full beam bearing on deck.
   1. Provide double dipped galvanized nails and Simpson Strong Tie fasteners and post bases for all connectors as shown.
   2. Provide aluminum flashing as necessary at wall/ deck/ exterior at all joints. Caulk with clear silicone.
   3. Use Column base equal to: Simpson Strong-Tie 8 In. x 8 In. Post Base MPBZ. Attach to existing Masonry on front porch.

4. Use Column top metal anchor equal to: Simpson Strong-Tie. CCOQ3. Attach to wood framing and top of finished column.
5. At Column top corners, use metal anchors equal to: Simpson Strong Tie RTC42 18-Gauge 2X Rigid Tie Connector.
6. Apply weather membrane barrier on walls and counterflash over deck framing. Weather barrier equal to: Grace Peel-and-Stick
7. Fasten ledger board to residence using approved ledger screws. Screws shall be equal to FastenMaster "Ledger Lok". Length 5" min. Install at 16" o.c. as noted on plans.
8. Steps: form stringers out of (2) 2 x 12's each side. Cut one stringer for full bearing. Steps – 2 x 12. Risers 2 x 6. Bottom of stair stringers shall be placed on metal bearing plates. Use Simpson Strong Tie Angle brackets for stringer attachment and secure to concrete slab.
9. Provide solid PVC skirting at deck as indicated on plans. Stain to match ramp. Place solid wood matching between posts and stringers and picture frame with 1" x 1" PT trim. Provide trim at all intersections. No raw edges. Galvanized finish nails. NOTE: skirting shall not touch the ground.
10. Composite deck: Equal to Azek "Harvest Collection". Color: Brownstone. Fasten all composite deck to pressure treated lumber, with matching recessed blind fasteners equal to FastenMaster Cortex for decking. Install deck with 2 ¾" screws.
11. Provide Cortex concealed fastening system and plugs at each deck fastener screw with matching composite plug. Use manufacturer's approved adhesive.
12. Provide matching composite edge banding, spindles, and handrails as detailed.
13. Handrails and Spindles: Aluminum.

2.2 DEFINITIONS

A. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.

B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
   1. WCLIB: West Coast Lumber Inspection Bureau.
   2. WWPA: Western Wood Products Association.

2.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
   1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
   2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
   3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

2.4 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 3 - PRODUCTS

3.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
   1. Factory mark each piece of lumber with grade stamp of grading agency.
   2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
   3. Provide dressed lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

3.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2.
   1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated on Drawings, and the following:
   1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
   2. Wood floor plates that are installed over concrete slabs-on-grade.

3.3 DIMENSION LUMBER FRAMING

A. Non-Load-Bearing Interior Partitions: Construction or No. 2 grade.
   1. Application: Interior partitions not indicated as load-bearing.
   2. Species:

a. Hem-fir; WCLIB, or WWPA.

B. Load-Bearing Partitions: No. 2 grade.
1. Application: Exterior walls and interior load-bearing partitions.
2. Species:
a. Hem-fir; WCLIB or WWPA.

C. Ceiling Joists: Construction or No. 2 grade.
1. Species:
a. Hem-fir; WCLIB or WWPA.

3.4 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
1. Blocking, and for handicapped handrails.
2. Nailers for attaching doors, windows.
3. ¾ wood sheathing at floor infill.

B. For items of dimension lumber size, provide Construction or No. 2 grade lumber and the following species:
1. Hem-fir; WCLIB or WWPA.

C. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

3.5 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

E. Lag Bolts: ASME B18.2.1.

F. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry assemblies and equal to four times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
   1. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

3.6 METAL FRAMING ANCHORS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Phoenix Metal Products, Inc.
   2. Simpson Strong-Tie Co., Inc.
   3. USP Structural Connectors.

B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.
   1. Use for interior locations unless otherwise indicated.

C. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.
   1. Use for wood-preservative-treated lumber and where indicated.

D. Rafter Tie-Downs: Bent strap tie for fastening rafters or roof trusses at each rafter to wall studs below, 1-1/2 inches wide by 0.050 inch thick. Tie fastens to side of rafter or truss, face of top plates, and side of stud below.

E. Wall Bracing: T-shaped bracing made for letting into studs in saw kerf, 1-1/8 inches wide by 9/16 inch deep by 0.034 inch thick with hemmed edges.

3.7 MISCELLANEOUS MATERIALS

A. Sill-Sealer Gaskets: (At new exterior wood framing plates) Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.

B. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

PART 4 - EXECUTION

4.1 INSTALLATION, GENERAL

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.

B. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

C. Metal Framing Anchors: Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

D. Install sill sealer gasket to form continuous seal between sill plates and foundation walls.

E. Do not splice structural members between supports unless otherwise indicated.

F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

G. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:
   1. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal- thickness.
   2. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet o.c.

H. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

I. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
   1. Use copper naphthenate for items not continuously protected from liquid water.

J. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
   1. NES NER-272 for power-driven fasteners.
   2. Table 2304.9.1, "Fastening Schedule," in Building Code of New York State (ICC's International Building Code).

K. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials.

Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

4.2 WOOD BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

C. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

4.3 WALL AND PARTITION FRAMING INSTALLATION

A. General: Provide single bottom plate and double top plates using members of 2-inch nominal thickness whose widths equal that of studs, except single top plate may be used for non-load-bearing partitions. Fasten plates to supporting construction unless otherwise indicated.

B. Construct corners and intersections with three or more studs.

C. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Support headers on jamb studs.
   1. For non-load-bearing partitions, provide double-jamb studs and headers not less than 4-inch nominal depth for openings 48 inches and less in width, 6-inch nominal depth for openings 48 to 72 inches in width, 8-inch nominal depth for openings 72 to 120 inches in width, and not less than 10-inch nominal depth for openings 10 to 12 feet in width.
   2. For load-bearing walls, provide double-jamb studs for openings 60 inches and less in width, and triple-jamb studs for wider openings. Provide headers of depth indicated.

D. Provide diagonal bracing in exterior walls, at both walls of each external corner, at 45-degree angle, full-story height unless otherwise indicated. Use 1-by-4-inch nominal- size boards, let-in flush with faces of studs or metal wall bracing, let into studs in saw kerf.

4.4 PROTECTION

A. Protect rough carpentry from weather.

END OF SECTION

SECTION 062000

INTERIOR FINISH CARPENTRY

PART 1 GENERAL

A. Interior and Exterior Trim Work related to new Doors, Windows and trim only.

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Rough Carpentry: Section 061000.

B. Doors: Section 081400.

C. Aluminum Windows: Section 085113

1.02 REFERENCES

A. Comply with the applicable provisions of the "Architectural Woodwork Standards" (First Edition-2009) (AWS) except as otherwise specified herein. References to "Premium", "Custom" and "Economy" Grades herein, shall be as defined in that Standard.

B. Lumber Standard: AWS Section 3.

B. Lumber Standard; American Softwood Lumber Standard: U.S. Dept. of Commerce Product Standard PS-20.

C. Panel Products: AWS Section 4.

D. Preservative Treatment Standard: American Wood Protection Association Standard (AWPA) U1-02.

1.03 SUBMITTALS

B. Samples:
   1. Transparent Finish Samples: 12 inches long x full width, 6 inch width for panels; each type wood species and item to receive finish:

1.04 QUALITY ASSURANCE

A. Mill and Producer's Label: Each lumber and panel item shall bear label indicating type, grade, mill, and grading agency on unfinished surface, or on end of material with finished surfaces.
   1. Panels shall bear APA or equivalent grade-mark; each panel.

SECTION 062000

INTERIOR FINISH CARPENTRY

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store materials and completed fabricated wood items in a dry, well ventilated area completely protected from the weather. Comply with temperature and humidity requirements for storage and installation as specified in the applicable quality standards.

B. Protect sanded and prefinished surfaces during handling and installation. Keep such surfaces covered with polyethylene film or other suitable protective covering.

1.06 PROJECT CONDITIONS

A. Environmental Requirements: Maintain constant minimum temperature of 60 degrees F and maximum relative humidity of 55 percent in spaces to receive the Work of this Section.

PART 2 PRODUCTS

2.01 MATERIALS

A. Interior Window and Door Trim Lumber: MDF Board.

B. Fasteners:
1. Nails, Spikes, and Staples: Size and type to suit application; non-ferrous metal or galvanized steel for exterior locations, high humidity locations, treated wood, and wood to receive transparent finishes; plain finish for other interior locations.
2. Bolts, Nuts, Washers, Lags, and Screws: Medium carbon steel; size and type to suit application; galvanized for exterior locations, high humidity locations, and treated wood; plain finish for other interior locations.
3. Anchors: Toggle bolt type for anchorage to hollow masonry; expansion shield and lag bolt type for anchorage to solid masonry or concrete; galvanized steel or stainless steel.

2.02 STANDING AND RUNNING TRIM AND FINISHES.

A. Comply with AWS Sections 6 and/or 12 as applicable, and as otherwise specified herein.

B. Interior Woodwork (to receive painted finish): AWS Custom Grade.
<u>Doors and Frames</u>.
1. Type: MDF Board - One Piece
2. Square 1 x 3 molding profile. (and skirting at window sill).
3. Replace existing window sill with MDF bd. – Painted.
4. Style Selections Remodel Window Trim Kit Model #WKT36-96.
5. Window Sills (with overlap, as drawn)

C. Interior base trim (throughout): Interior running and standing trim: Base shall be MDF (as noted) Paint white.
1. Base shall be Burton Moldings Style # 095.

D. Exterior Trim: as noted.
   1. LP Smartside. – Smooth Finish. 1" thickness. Factory Paint White.
   2. Caulk all around.

E. Finishes: All interior Finish Carpentry shall be painted white.

3.01 FABRICATION

A. Machine and sand wood surfaces to comply with the requirements of the AWS Quality Grade specified.

B. Mill assemble items to largest sizes practicable, to minimize field cutting and jointing. Allow for cutting and fitting where necessary to fit at the Site.

PART 4 EXECUTION

4.01 EXAMINATION

A. Verification of Conditions: Examine substrate conditions and surfaces upon which finish Work is to be installed. Do not proceed with finish Work until unsatisfactory substrate conditions are corrected.

4.02 PREPARATION

A. Condition the Work of this Section to average prevailing humidity conditions in installation areas prior to installing.

4.03 INSTALLATION

A. Comply with workmanship and finishing standard requirements of the AWS Quality Grade specified herein.

B. Install the Work plumb, level, and free of distortion. Shim where required, with concealed shims.

C. Cut wood items to fit unless specified to be shop-fabricated, or shop-cut to exact size. Scribe and cut for accurate fit where Work abuts other finish Work. Drill pilot holes at corners before making cutouts.

D. Distribute defects to the greatest appearance advantage possible.

E. Trim and Molding: Install in single, un-jointed lengths at openings and for runs less than the maximum lumber length available. For long runs, use only 1 piece less than the

maximum length available in any straight run. Stagger joints in adjacent members. Cope molding at returns. Miter at corners.

F. Attach the Work securely in place.
   1. Nailing: Blind nail where possible. Use finishing nails where exposed. Set nail heads for filling, except for exterior wood scheduled to receive natural finish (if any).
   2. Anchoring: Secure the Work to anchors or to blocking which is built-into or directly attached to substrates.

5.01 CLEANING

A. Clean exposed surfaces of prefinished Work.

5.02 PROTECTION

A. Protect installed Work from damage by Work of other trades. Maintain temperature and humidity requirements during the construction period in interior installation areas.

END OF SECTION

SECTION 062013

EXTERIOR FINISH CARPENTRY

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. Exterior siding, board and batten strips and trim boards. (see also Section 074620)
   2. Exterior Fiberglass Structural Decorative Columns.
   3. Soffits and fascias.
   4. Trim Dentils

1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Stack plywood, and other panels flat with spacers between each bundle to provide air circulation. Protect materials from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

B. Protect decorative trim, and columns in an area free from traffic. Keep dry until use.

1.5 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecast weather conditions permit work to be performed and at least one coat of specified finish can be applied without exposure to rain, snow, or dampness.

B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.
   1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 EXTERIOR FINISH PRODUCTS

A. Product/Manufacturer: Basis of design.
Subject to compliance with requirements, available products may be incorporated into the Work include, but are not limited to, the following:
   1. Exterior porch ceiling: James Hardi Company. Hardi-Plank cementitious siding.
      a. Style: “Beaded Cedarmill”. Color: White.

b. Apply air barrier on all surfaces to receive siding equal to DuPont “Tyvek” Commercial air barrier.
c. Wood grain finish.
d. Product is to be factory painted. Touch up field painting only. Colors shall be equal to: White.

2 Fascias: LP SmartSide solid soffit - Architectural Collection. Cedar
Soffit trim: LP SmartSide.

3. Architectural column covers: Equal to Fypon. Fasten to structural wood columns
A. 6" Width x 96" Height Non-Tapered Plain (Economy) Fypon column wrap. Model No.: CWPR6X96SFT. 2 lengths required. Trim as necessary.

4. Decorative wall corbelling on trim: Equal to Fypon. Model DTLB5X6X8. Secure with screws and adhesive.

2.2 MISCELLANEOUS MATERIALS

A. Fasteners for Exterior Finish Carpentry: Provide nails or screws, in sufficient length to penetrate not less than 1-1/2 inches into wood substrate.
1. For face-fastening soffits, provide ringed-shank siding nails or hot-dip galvanized-steel siding nails unless otherwise indicated.

B. Sealants: Latex, complying with ASTM C 834 Type OP, Grade NF and with applicable requirements in Section 079200 "Joint Sealants," recommended by sealant manufacturer and manufacturer of substrates for intended application.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.

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

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

3.3 INSTALLATION, GENERAL

A. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements.
1. Do not use manufactured units with defective surfaces, sizes, or patterns.

B. Install exterior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
   1. Scribe and cut exterior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
   2. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining exterior finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.
   3. Coordinate exterior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate exterior finish carpentry.

3.4 ADJUSTING

A. Replace exterior finish carpentry that is damaged or does not comply with requirements. Exterior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

3.5 CLEANING

A. Clean exterior finish carpentry on exposed and semi-exposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

3.6 PROTECTION

A. Protect installed products from damage from weather and other causes during construction.

B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.
   1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 062013

SECTION 064900

DECORATIVE SHUTTERS

PART 1 . GENERAL

1.1 SECTION INCLUDES

A. Decorative Custom Shop Made Shutters at gable end wall and rear of building.
B. Shutter mounting hardware

1.2 RELATED SECTIONS

1. Section 061000 – Rough Carpentry.
2. Section 062000 – Finish Carpentry.
3. Section 064200 - Fiber Cement Siding
4. Section 079200 - Joint Sealants
5. Section 099000 – Painting and Coating.

1.3 SUBMITTALS

1. Submit under provisions of Section 016000. Product Requirements.
2. 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.
3. Shop Drawings: Include detailed drawings showing complete dimensions, all materials, and hardware.

1.4 QUALITY ASSURANCE

1. Manufacturer Qualifications: Company specializing in the fabrication of solid extruded PVC, with not less than 10 years of experience.
2. Installer Qualifications: Minimum 2 years of experience installing similar products.

1.5 DELIVERY, STORAGE, AND HANDLING

1. Deliver, store, and handle in accordance with manufacturer's recommendations.

2 PRODUCTS

2.1 MANUFACTURER

1. Acceptable Manufacturer: Aeratis International, Address: PO Box 11087, Chandler, AZ 85248, Website: https://www.aeratisshutters.com Email: tidwell@aeratis.com.
2. Approved Equal.

2.2 REFRENCES

1. ASTM D792: Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
2. ASTM D1761: Standard Test Methods for Mechanical Fasteners in Wood.

3. ASTM D6109: Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastic Lumber and Related Products.
4. ASTM D6341: Standard Test Method for Determination of the Linear Coefficient of Thermal Expansion of Plastic Lumber and Plastic Lumber Shapes Between -30 and 1400F (34.4 and 600C).
5. ASTM D7031: Standard Guide for Evaluating Mechanical and Physical Properties of Wood-Plastic Composite Products.

1. Shutter Type: Decorative Louvered Shutter - Type:1
    1. Species: Solid Extruded PVC.
    2. Construction: Butt Joints with extended fasteners and construction adhesive.
    3. Quantity: 2 as noted.

2. Shutter Details
    a. Shutter Height: {shutter height: 92”}
    b. Shutter Width: {shutter width: each 24”}
    c. Side Stile Thickness: 1-3/8 inches.
    d. Side Stile Width: 2-7/8 inches.
    e. Top Rail Width: 2-3/4 inches.
    f. Center Rail Width: 2-3/4 inches.
    g. Bottom Rail Width: 4-1/2 inches.
    h. Mid-Rail Location: midrail place centered
    i. Louvers: 1-5/8 x 3/8 inches.

3. Finish: shop finished, and delivered.
    a.. Color: Sherwin Williams Semi-gloss paint: Color: SW 6221

3 EXECUTION

3.1 EXAMINATION

1. Do not begin installation until substrates have been properly prepared.
2. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

1. Clean surfaces thoroughly prior to installation.

3.3 INSTALLATION

1. Install in accordance with manufacturer’s instructions, approved submittals, and in proper relationship with adjacent construction. Install plumb and level.

2. Caulk all around installation with Sealant.

SECTION 064900

DECORATIVE SHUTTERS

2.4. PROTECTION

1. Protect installed products until completion of project.
2. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 067300-1

COMPOSITE DECKING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Composite Decking for decks and porches.

1.2 RELATED SECTIONS

A. Section 033000 – Cast-in-place concrete
B. Section 06-1100 – Rough Carpentry

1.3 REFERENCES

A. ASTM D-7032-04: Standard Specification for Establishing Performance Ratings for Wood- Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails), ASTM International.

B. ASTM D-7031-04: Standard Guide for Evaluating Mechanical and Physical Properties of Wood-Plastic Composite Products, ASTM International

C. ASTM E-84-01: Test Method for Surface Burning Characteristics of Building Materials, ASTM International.

D. ASTM D 570: Water Absorption of Plastics

E. ASTM D 1761: Mechanical Fasteners in Wood

F. ASTM D -1413-99: Test method for Wood Preservatives by Laboratory Soil-block Cultures

G. ASTM C177: Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus

1.4 DESIGN/PERFORMANCE REQUIREMENTS

A. Structural Performance:
   a. Deck: Uniform Load – 100lbf/sq.ft.
   b. Tread of Stairs: Concentrated Load: 750 lbf/sq.ft., and 1/8” max. deflection with a concentrated load of 300 lbf on area of 4 sq. in.

B. Fire-Surface Burning Characteristics per ASTM E-84.

1.5 SUBMITTALS

A. Product Data Indicate sizes, profiles, surface style, and performance characteristics

B. Samples: For each product specified, one sample representing actual product color, size, and finish.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store composite decking products on a flat and level surface. Adjust support blocks accordingly.

B. Support composite decking bundles on supplied dunnage.

C. When stacking composite decking bundles, supports should start approximately 8" from each end and be spaced approximately 2ft on center. Supports should line up vertically/perpendicular to the decking product.

D. Do not stack composite decking more than 14 bundles.

E. Keep material covered using the provided bundle cover until time of installation.

F. See manufacturer's website for detailed storage recommendations;

1.7 WARRANTY

A. Provide manufactures warranty against rot, decay, splitting, checking, splintering, fungal damage, and termite damage for a period of 25 years for a residential installation and 10 years for a commercial installation. In addition, provide the composite decking Fade and Stain Warranty against food staining and fading beyond 5 Delta E (CIE units) for a period of 25 years for a residential installation and 10 years for a commercial installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Contract Documents are based on products supplied by; Trex Company, Inc., 160 Exeter Dr., Winchester, VA 22603.

B. Approved equal.

2.2 APPLICATIONS/SCOPE

A. Wood-Plastic Composite Lumber; a. Material Description: Composite Decking consisting of recycled Linear Low Density Polyethylene (LLDPE) and recycled wood. The product is extruded into shapes and sizes as follows: Trex Select Decking Boards; refer to drawings for thicknesses.
   1. lengths – 12, 16, and 20 feet.
   2. Color – Refer to drawings.

B. Physical and Mechanical Properties as follows:

Test	Test Method	Value
Flame spread	ASTM E 84	85
Thermal Expansion	ASTM D 1037	1.9 x 10-5 inch/inch/degreeF
Moisture Absorption	ASTM D 1037	< 1.2%
Screw Withdrawal	ASTM D1761	388 lbs/in
Fungus Resistance	ASTM D1413	Rating - no decay
Termite Resistance	AWPAE1-72	Rating = 9.7

Ultimate (Typical)Values *		Design Values.	
Compression Parallel	ASTM D198	1588 psi	540 psi
Compression Perpendicular	ASTM D143	1437 psi	540 psi
Bending Strength	ASTM D198	3280 psi	500 psi
Shear Strength	ASTM D143	1761 psi	360 psi
Modulus of Elasticity	ASTM D4761	400,000psi	200,000 psi
Modulus of Rupture	ASTM D4761	3750 psi	500 psi

A. Ultimate strength values are not meant for design analysis. Design values are for temperatures up to 130F (54C)

2.2 ACCESSORIES

A. Fasteners: a. Universal Hideaway Hidden Fasteners.

B. Screws; refer to manufacturer's installation instructions for the updated recommendations on fasteners.

PART 3 EXECUTION
3.1 INSTALLATION

A. Install according to manufacturer's installation guidelines.

B. Cut, drill, and rout using carbide tipped blades.

C. Do not use composite wood material for structural applications.

D. Picture frame all perimeter edges of decking.

3.2 CLEANING

A. Following cleaning recommendations as found in manufacturer's installation guide.

END OF SECTION 067300

SECTION 07 41 13

SHEET METAL ROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Metal roofing, including flashing and accessories for front porch roofs.

B. Metal wall and fascia panels.

C. Metal soffit panels.

1.2 RELATED SECTIONS

A. Section 076200 - Sheet Metal Flashing and Trim [07 62 00] - Sheet Metal Flashing and Trim.

B. Section 07 71 13 - Manufactured Copings [07 71 00] - Manufactured Roof Specialties: Coping and gravel stops.

C. Section 07 90 00 - Joint Protection [07 92 00] - Joint Sealers.

1.3 REFERENCES

A. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2001a.

B. ASTM A792 / A792M - Standard Specification for Steel Sheet, 55 percent Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

C. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2001.

D. ASTM E 283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 1991 (Reapproved 1999).

E. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000.

F. ASTM E 408/C - 1371: "Standard Test Method for Total Normal Emittance of Surfaces Using inspection - Meter Techniques.

G. ASTM E 903/C - 1549: Standard Test Method for Solar Absorbtance, using Integrating Spheres.

H. ASTM E 1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference; 1995.

I. ASTM E 1680 - Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems; 1995.

J. Dade County County (Florida) Acceptance Report Numbers: 01-1106-01 and 01-1106-02.

K. FM - Tests Requirements for Class 1 Panel roofs, Factory Mutual Research Corporation.

L. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies; 1994.

M. UL2218: Class 4 Impact Resistance Rating.

N. SMACNA (ASMM) - Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors National Association; 1993.

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: Submit shop drawings showing layout, profiles and product components, including anchorage, accessories, finish colors and textures.

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

E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

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

G. Operation and Maintenance Data: Include methods for maintaining installed products and precautions relating to cleaning materials and methods that might be detrimental to finishes and performance.

H. Close Out: Warranty documents specified herein.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Installer with documented experienced in performing work of this section who has specialized in the installation of work similar to that required for this project.

B. Pre-Installation Meeting: Conduct pre-installation meeting to acquaint installers of roofing and related work with project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging with identification labels intact until ready for installation.

B. Store materials protected from exposure to harmful conditions. Store material in dry, above ground location.
   1. Stack pre-finished material to prevent twisting, bending, abrasion, scratching and denting. Elevate one end of each skid to allow for moisture to run off.
   2. Prevent contact with material that may cause corrosion, discoloration or staining.
   3. Do not expose to direct sunlight or extreme heat trim material with factory applied strippable film.

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 WARRANTY

A. Manufacturer's Warranty: Provide manufacturer's standard warranty document executed by authorized company official covering finish, including color, fade, chalking and film integrity.

B. Warranty Period: 20 years commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer: Petersen Aluminum Corp., which is located at: 1005 Tonne Rd.; Elk Grove Village, IL 60007; Toll Free Tel: 800-722-2523; Tel: 847-228-7150; Fax: 847-956-7968; Email: request info (rheselbarth@petersenmail.com); Web: https://www.pac-clad.com

B. Approved equal.

C. Requests for substitutions will be considered in accordance with provisions of Section 016000 - Product Requirements.

2.2 SHEET METAL ROOFING

A. General: Factory fabricated panels; panels fabricated on site using portable roll former are prohibited.
   1. Performance Requirements: Provide sheet metal roofing that has been manufactured, fabricated and installed to achieve the following performance without defects, damage, failure or infiltration of water.
      a. Wind Uplift: Provide UL 580 Class 90 rated assembly.

b. FM: Test Requirements for Class 1 panel roofs.
c. Static Air Infiltration: 0.06 cu ft/min/sq ft (1.1 cu m/h/sq m) at 6.24 lb/sq ft (300 Pa) air pressure differential, maximum, when tested in accordance with ASTM E 283 or ASTM E 1680.
d. Water Infiltration: No evidence of water penetration at inward static air pressure differential of 12.0 lb/sq ft (575 kPa), when tested in accordance with ASTM E 331 or ASTM E 1646.
e. Thermal Movement: Accommodate movement expected due to ambient and surface temperature ranges likely to occur at project site.

2. Panel Lengths: As indicated on drawings; panels 25 feet and less fabricated in one continuous length.
3. Texture: Smooth texture, dull matte specular gloss 25 to 35 percent at 60 degrees F (15.5 degrees C).
4. Texture: Standard E-5 stucco embossed pattern.
5. Texture: Striated.
6. Finish: Factory applied PAC-CLAD finish:
   a. Topside: Full-strength fluoropolymer, 70 percent Kynar 500 or Hylar resin, 1.0 mil (0.025 mm) total dry film thickness.
   b. Underside: Wash coat of 0.3 to 0.4 mil (0.076 to 0.1 mm) dry film thickness.
   c. Color: As selected by Architect from manufacturer's standard colors.
7. Panel Fasteners: Non-penetrating type, as required to achieve wind uplift rating or otherwise as recommended by manufacturer.

B. Roof Panels: Petersen Aluminum PAC-CLAD 150 Redi-Roof Panels; tension leveled.
1. Panel Type: 180 Deg. flat panels, double lock seam 1-1/2 inch batten height; with batten fabricated from matching material with positive, metal-to-metal locking mechanism; offset profile.
2. Material: 0.032 inch (0.8 mm) painted aluminum, 3105-H14 alloy.
3. Panel Width: 18 inches (457 mm), center to center.
4. Profile: as indicated on drawings.
5. Eave Notching: Factory produced eave notching for trimmed eave panels.

C. Wall, Fascia, and Soffit Panels: Petersen Aluminum PAC-CLAD Flush Panels; tension leveled flat panels with interlocking 1 inch (25 mm) high legs.
1. Type: Flush seam.
2. Stiffening Bead: One, manufacturer's standard.
3. Stiffening Beads: Two, manufacturer's standard.
4. Material: 22 gage, 0.03 inch (0.76 mm) ASTM A792 /A792M Galvalume steel, structural quality.
5. Material: 0.032 inch (0.8 mm) aluminum, ASTM B 209 3105-H14 alloy.
6. Panel Width: 11 inches (279 mm), center to center.

D. Soffit Panels: Petersen Aluminum Soffit Panels; V-grooved.
1. Type: PAC-850 (Hook and Grab Interlock Profile).
2. Style: Perforated, entire panel.
3. Material: 0.032 inch (0.8 mm) aluminum, ASTM B 209 3105-H14 alloy.

4. Panel Width: 12 inches (305 mm), center to center.

E. Flashing and Trim: Manufacturer's standard flashing and trim profiles, factory formed; fabricated as recommended in SMACNA Architectural Sheet Metal Manual.
1. Material: Same as roof panels.
2. Material: 22 gage, 0.03 inch (0.76 mm) ASTM A792 /A792M Galvalume steel, structural quality.
3. Material: 0.032 inch (0.8 mm) aluminum, ASTM B 209 3105-H14 alloy.
4. Finish: To match roof panels.
5. Color: To match roof panels.

2.3 ACCESSORY MATERIALS

A. Underlayment: ASTM D 226, Type II No. 30 asphalt saturated organic roofing felt.

B. Plywood Deck: 5/8 inch (16 mm) nominal thickness; as specified in Section 06 10 00 - Rough Carpentry.

C. Sealant: Elastomeric.

D. Bituminous Coating: Cold-applied asphaltic mastic, free of asbestos fibers, sulfur, and other harmful impurities.

E. Touch-Up Paint: Approved by panel manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrates are acceptable for roofing installation in accordance with manufacturer's instructions.

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

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

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Coordinate metal roofing with other work, including but not limited to drainage, flashing and trim, deck substrates, parapets, copings, walls, and other adjoining work.

C. Install metal roofing panels to profiles, patterns and drainage indicated, in accordance with manufacturer's instructions, and as necessary to achieve specified performance and a leak-free Installation. Allow for structural and thermal

movement.

D. Separate dissimilar metals using bituminous coating to prevent galvanic action.

E. Use fasteners recommended by panel manufacturer; conceal fasteners wherever possible; cover and seal exposed fasteners.

F. Provide uniform, neat seams; provide sealant-type joint where indicated and form joints to conceal sealant.

3.3 FIELD QUALITY CONTROL

A. Post Installation Testing: Owner reserves right to perform post installation testing of installed sheet metal roofing.

B. Manufacturer's Field Services: Upon Owner's request, provide manufacturer's field service consisting of product use recommendations and periodic site visit for inspection of product installation in accordance with manufacturer's instructions.

3.4 CLEANING

A. Remove temporary coverings and protection of adjacent work areas.

B. Touch-up, repair or replace damaged products.

C. Clean in accordance with manufacturer's instructions prior to Substantial Completion.

D. Remove construction debris from project site and legally dispose of debris.

3.5 PROTECTION

A. Protect installed products until completion of project.

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

END OF SECTION

SECTION 070160

FLASHING AND TRIM

PART 1 GENERAL

1.01 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

A. Asphalt Shingle Roofing Section 0730110

B. Metal Roofing – Section 074113

C. Fiber Cement Siding. Section 074620

D. Exterior Finish Carpentry. 062013

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Rough Carpentry. Section 061000

1.03 REFERENCES

A. SMACNA: Sheet Metal and Air Conditioning Contractors' National Association, 4201 Lafayette Center Dr., Chantilly, VA 20151-1209, (703) 803-2980, www.smacna.org.

B. CDA: Copper Development Association Inc., 260 Madison Ave., New York, NY 10016, (212) 251-7200, www.copper.org

C. ASTM: ASTM International, 100 Barr Harbor Dr., PO Box C700, West Conshohocken, PA, 19428-2959, (610) 832-9500, www.astm.org.

1.04 SYSTEM DESCRIPTION

A. Metal flashings, trim, and related accessories that form terminations and waterproof connections.

1.05 SUBMITTALS

A. Product Data: Catalog sheets, specifications, installation instructions for each item specified except for shop or job formed items, solder, flux, and bituminous paint.

C. Samples:

1. Materials for Flashings: One 6 inch sq piece, for each type material specified.

2. Exterior window trim. Full section, 12 inches long.

1.06 QUALITY ASSURANCE

A. Except as otherwise shown or specified, comply with applicable recommendations, details, and standards of CDA, and SMACNA.

B. Manufacturer's Recommendations: For factory fabricated items, follow the manufacturer's recommendations and installation instructions unless specifically shown or specified otherwise.

1.07 PROJECT CONDITIONS

A. Do not execute the Work of this Section unless the Director's Representative is present, or unless they direct that the Work be performed during their absence.

B. Make the roof and all uncompleted flashings watertight at the end of each work day.

PART 2 PRODUCTS

2.01 MATERIALS FOR FLASHING FABRICATION

A. Aluminum Sheet: Standard pre-finished aluminum sheet. ASTM B 209, 3003-H14 alloy.

2.02 FASTENERS

A. Nails: "Stronghold" type large flat head roofing nail.
   1. For Aluminum: Hard aluminum alloy or stainless steel.
   4. For Galvanized: Galvanized.

B. Screws, Bolts, and Other Fastening Accessories:
   1. For Aluminum: Hard aluminum alloy or stainless steel.
   4. For Galvanized: Stainless steel.

C. Anchors: Provide one of the following types:
   1. Hammer driven anchors, consisting of a stainless steel drive pin and a plastic or corrosion resistant metal expansion shield inserted thru a stainless steel disc with an EPDM sealing washer.
   2. Self-tapping, corrosion resistant, concrete and masonry screw inserted thru a stainless steel disc with an EPDM sealing washer.

2.03 MISCELLANEOUS MATERIALS

A. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.04 FABRICATION

A. Where practicable, form and fabricate sheet metal Work in the factory or shop. Produce bends and profiles accurately to the indicated shapes. Where not indicated or specified, follow the applicable requirements of the reference standards listed in PART 1.

B. Base Flashing:
   1. Prefinished Aluminum: .032 inch.

C. Door trim and Window Flashing:
   1. Mill finish Aluminum: .025 inch.

PART 3 EXECUTION

3.01 EXAMINATION

A. Coordinate the Work of this Section with other Work for the correct sequencing of items that make up the entire system of weatherproofing or waterproofing.

3.02 PREPARATION

A. Do not install the Work of this Section unless all necessary nailers, blocking and other supporting components have been provided.

B. Do not install the Work of this Section unless all substrates are clean and dry.

3.03 INSTALLATION

A. Isolation: Separate dissimilar metals from each other with bituminous paint.

B. Installing Pipe Flashing: (See also roof vents)
   1. Extend the base flashing a minimum of 5 inches onto the roof surface. Terminate the bottom exposed edge with a 1/2 inch folded seam. Solder the base flashing to the tube flashing.
   2. Install the flashing after the course of shingles immediately below the pipe is installed so that the bottom side of the flashing is over the shingle

and the sides and top are beneath the shingles. Nail the top and sides of the flashing only.

3. Provide a cap flashing fabricated to slip over the tube flashing and the pipe. Lap the tube flashing a minimum of 3 inches and the pipe a minimum of one inch. Solder all seams.

C. Door and Window Flashing:

1. Install the flashing in one continuous length from side to side.

END OF SECTION

SECTION 072110

BUILDING INSULATION

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A.	Rough Carpentry	Section 061000
B.	Fiber Cement Siding	Section 074620
C.	Metal Flashing	Section 070610

1.02 ACCESSORIES

A. Board and batten Rainscreen - Benjamin Obdyke HydroGap Drainable Housewrap. (install on wood frame construction on second floor only).

B. Rainscreen base trim vent and bug screen – Cor-a-vent. SV- 5 Rainscreen Siding Vent. Install all along base of wall insulation, per manufacturer's instructions.

1.03 SUBMITTALS

A. Product Data: Catalog sheets, specifications, and installation instructions for each type of insulation specified.
   1. Include data substantiating that the materials comply with the specified thermal resistance and vapor resistance qualities.

B. Quality Control Submittal:
   1. Certificate: Affidavit required under Quality Assurance Article.

1.04 QUALITY ASSURANCE

A. Allowable Thickness Variations: Manufacturer's standard units which vary slightly from the thickness indicated may be acceptable, subject to the approval of the Architect.

B. Thermal Resistance: The thicknesses shown are for the thermal resistance (R-Value in accordance with ASTM C 177 or ASTM C 518) specified for each material. The R-Values specified are minimum acceptable. Provide adjusted thicknesses as directed for the use of material having a different thermal resistance.

C. Certification: Affidavit by the polystyrene thermal insulation manufacturer, certifying that the insulation was manufactured with CFC and HCFC-free blowing agents.

SECTION 072110

BUILDING INSULATION

1.05 DELIVERY, STORAGE, AND HANDLING

A. Do not allow insulation materials to become wet or soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage, and protection during installation.

B. Complete the installation and concealment of insulation materials as rapidly as possible.

1.06 PROJECT CONDITIONS

A. Do not proceed with the installation of insulation on walls or under slabs until the Work which follows (and which conceals the insulation) is ready to be performed.

B. Examination of Substrate: Examine the substrate and the conditions under which the insulation Work is to be performed. Do not proceed with the insulation Work until unsatisfactory conditions have been corrected.

PART 2 PRODUCTS

2.01 MATERIALS

A. Rigid (Board) Insulation: Extruded polystyrene thermal insulation boards; ASTM C 578, Type IV, manufactured with CFC and HCFC-free blowing agents. Product equal to
   1. Owens Corning Formular. NGX. Model 20WENGX,
   2. Approved equal.
      a. Aged R-Value: 1 Inch Thick: R = 5 @ 40 degrees F and 5 @ 75 degrees F.
      b. Edges and Ends: Square or tongue-and-groove at manufacturer's option.
      c. Install between furring strips on masonry (first floor walls only).

C. Adhesive for Bonding Insulation: The type recommended by the insulation manufacturer.

E.. Mechanical Anchors: Type and size shown or, if not shown, as recommended by the insulation manufacturer for the type of application shown and condition of substrate.

F.. Vapor Barrier: Polyethylene sheeting; ASTM D 4397; 6 mils minimum thickness, 3.7 g/m2 per 24 hr maximum water vapor transmission rate.

PART 3 EXECUTION

3.01 PREPARATION

A. Verify that adjacent materials are dry and ready to receive insulation.

B. Close off openings in areas to receive loose insulation to permanently prevent escape of insulation.

3.02 INSTALLATION

A. Comply with manufacturer's printed instructions for the particular conditions of installation in each case. If printed instructions are not available or do not apply to the project conditions, consult the manufacturer's technical representative for specific recommendations before proceeding with the work.

B. Extend insulation full thickness over entire surface to be insulated. Apply a single layer of insulation of the required thickness, unless otherwise indicated or required to make up the total thickness. Cut and fit tightly around obstructions, and fill voids with insulation.
   1. Do not place insulation over, or within 3 inches of recessed lighting fixtures.

END OF SECTION

SECTION 073113

FIBERGLASS BASED ASPHALT SHINGLE ROOF AND ACCESSORIES

1.0 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fiberglass-based asphalt shingles.
B. Moisture shedding underlayment, eaves, valley and ridge protection.
C. Associated metal flashing and roof accessories.
D. Other related items and products.

1.2 RELATED SECTIONS

A. Section 07 6200 - Sheet Metal Flashing and Trim.

1.3 REFERENCES

A. ASTM A 653/A 653M – Standard Specification for Steel Sheets, Zinc-Coated (Galvanized) or Zinc-Iron-Alloy-Coated (Galvannealed) by the Hot-Dip Process
B. ASTM B 209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
C. ASTM D 225 – Standard Specification for Asphalt Shingles (Organic Felt) Surfaced with Mineral Granules.
D. ASTM D 226 – Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
E. ASTM D 1970 – Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials used as Steep Roofing Underlayment for Ice Dam Protection.
F. ASTM D 3018 – Standard Specification for Class A Shingles Surfaced with Mineral Granules.
G. ASTM D 3161 – Standard Test Method for Wind Resistance of Asphalt Shingles (Fan-Induced Method).
H. ASTM D 3462 – Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules.
I. ASTM D 4586 – Standard Specification for Asphalt Roof Cement, Asbestos-Free. 07 3113-1 Asphalt Shingle Roofing Systems
J. ASTM D-4869 – Standard Specification for Asphalt-Saturated Organic Felt Shingle Underlayment Used in Roofing.
K. ASTM D 6757 – Standard Specification for Inorganic Underlayment for Use with Steep Slope Roofing Products.
L. ASTM E 108 – Standard Test Methods for Fire Test of Roof Coverings
M. ASTM G 21 – Determining Resistance of Synthetic Polymers to Fungi

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's printed product information indicating material characteristics, performance criteria and product limitations.
B. Manufacturer's Installation Instructions: Provide published instructions that indicate preparation required and installation procedures.

C. Certificate of Compliance: Provide Certificate of Compliance from an independent laboratory indicating that the asphalt fiberglass shingles made in normal production meet or exceed the requirements of the following:
1. ASTM E 108/UL 790 Class A Fire Resistance
2. ASTM D 3161/UL 997 Wind Resistance.
3. ASTM D 3462

D. Shop Drawings: Indicate specially configured metal flashing, jointing methods and locations, fastening methods and locations and installation details as required by project conditions indicated.

1.5 QUALITY ASSURANCE

A. Installer Minimum Qualifications: Installer shall perform work in accordance with NRCA Roofing and Waterproofing Manual Work shall be acceptable to the manufacturer.

B. Pre-Installation Meeting – Conduct a pre-installation meeting at the site prior to commencing work of this section: Require attendance of entities directly concerned with roof installation. Agenda will include:
1. Installation procedures and manufacturer's recommendations
2. Safety procedures
3. Coordination with installation of other work
4. Coordination with asbestos removal, if applicable.
5. Availability of roofing materials.
6. Preparation and approval of substrate and penetrations through roof.
7. Other items related to successful execution of work

C. Maintain one copy of manufacturers application instructions on the project site.

D. Verify that manufacturer's label contains references to specified ASTM standards

1.6 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. Deliver shingles to site in manufacturer's unopened labeled bundles. Promptly verify quantities and conditions. Immediately remove damaged products from site.

1.7 PROJECT CONDITIONS

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

B. Take special care when applying Winterguard Waterproofing Shingle Underlayment, or equal, and shingles when ambient or wind chill temperature is below 45 degrees F (7 degrees C). Tack WinterGuard in place if it does not adhere immediately to the deck.

1.8 WARRANTY

A. Manufacturer's Warranty: Furnish shingle manufacturer's warranty for the product listed in Part 2.
1. 30 year limited warranty.

B. Warranty Supplement: Provide manufacturer's supplemental warranty (CertainTeed's Surestart or Surestart Plus) to cover labor and materials in the event of a material defect for the following period after completion of application of shingles:
1. First Ten Years (All Lifetime Warranty products
2. First Five Years (All 25 to 30 year Shingles)
3. First Three Years (CT20 and CT20 AR)
4. No Surestart or Surestart Plus for any shingle applied to inadequately ventilated roof deck.

C. Warranty Transferability Clause: Make available to Owner shingle manufacturer's standard option for transferring warranty to a new owner.

D. Wind Warranty Upgrade to 130 mph for first 15 years provided all manufacturers' conditions and instructions are met by contractor.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer:
1. CertainTeed Landmark Shingle: Conforming to ASTM D3018Type I – Self-Sealing, UL Certification of ASTM D 3462, ASTM D 3161/UL997 70-mph Wind Resistance and UL Class A Fire Resistance, glass fiber mat base, ceramically colored/UV resistant mineral surface granules across entire face of shingle, two piece laminate shingle.

B. Weight: 240-245 pounds per square (100 square feet) (12.0 kg/sq m).

C. Acceptable Singles by other manufacturers;
1. GAF Timberline.
2. IKO Cambridge.
3. Owens Corning.
4 Or approved equal.

D. Color: To be selected by RHA from manufacturer's standards.

2.3 SHEET MATERIALS

A. Eaves Protection: CertainTeed "WinterGuard", or approved equal; ASTM D1970 sheet barrier of self-adhering rubberized asphalt membrane shingle underlayment having internal reinforcement and "split" back plastic release film; provide material warranty equal in duration to that of shingles being applied.

B. Underlayment: ASTM D 226, Asphalt saturated felt, 15-lb (non-perforated).

C. Waterproofing Underlayment: CertainTeed "WinterGuard", or approved equal; ASTM D 1970 sheet barrier of self-adhering rubberized asphalt membrane shingle underlayment having internal reinforcement, and "split" back plastic release film; Use in "low slope' areas (below 4:12, but no less that 2:12 pitch); provide material warranty with equal in duration to that of shingles being applied.
   1. CertainTeed WinterGuard Granular
   2. Approved equal.

2.4 FLASHING MATERIALS

A. Sheet Flashing: ASTM A 361/A361M; 26 Guage (0.45 mm) steel with minimum G115/Z350 galvanized coating

B. Sheet Flashing: ASTM B 209; 0.025 (0.63mm) thick aluminum, mill finish.

C. Bitumious Paint: Acid and alkali resistant type; black color.

D. Tinner's Paint: Color as selected by RHA to coordinate with shingle color.

2.5 ACCESSORIES

A. Nails: Standard round wire type roofing nails, corrosion resistant; hot dipped zinc coated steel, aluminum or chormated steel; minimum 3.8 inch (9.5mm) head diameter; minimum 11 or 12 gage (2.5mm) shank diameter; shank to be sufficient length to penetrate through the roof sheathing or ¾ inch (19mm) into solid wood, plywood or non-veneer wood decking.

B. Asphalt Roofing Cement: ASTM D 4586, Type I or II

2.6 OTHER ITEMS AND PRODUCTS

A. Metal Drip and Apron Flashing: Minimum .024 inch aluminum, fluoropolymer finish, break and formed to provide 3 inch roof deck flange, 1-1/2 inch fascia flange, with 5/16 inch drip at lower edge. Provide in minimum 8 foot lengths.

B. Ridge Vents: Manufacturer's standard low profile, on the rooftop ventilation strip made of polypropylene or other UV-stabilized plastic.
   1. Air Vent, Shingle-over ridge vent.
   2. Or approved equal.

C. Plumbing Vents: Install new rubber boot over existing pipe vents. Equal to:
   1. Oatey: 14052 Retro Master 0.25"-5.75" Pipe Diameter Roof Flashing 8" x 8" Base, Black. Install per manufacturer's instructions.

2.7 FLASHING FABRICATION

A. Form flashing to profiles indicated on attached Drawings and to protect roofing materials from physical damage and shed water.

B. Form sections square and accurate to profile, in maximum possible lengths, free from distortion or defects detrimental to appearance or performance.

PART 3 EXECUTION
3.1 EXAMINATION

A. Verify existing site conditions under provisions of Division 1 Sections.

B. Verify that roof penetrations and plumbing stacks are in place and flashed to deck surfaces.

C. Verify deck surfaces are dry and free of ridges, warps or voids.

3.2 ROOF DECK PREPARATION

A. Follow shingle manufacturer's recommendations for acceptable roof deck material.

B. Broom clean deck surfaces under eave protection and underlayment prior to their application.

3.3 INSTALLATION – EAVE ICE DAM PROTECTION

A. Place eave edge and gable metal edge flashing tight with fascia boards. Weather-lap joints 2 inches. Secure flange with nails spaced 8 inches on center.

B. Apply CertainTeed "WinterGuard", or equal, Waterproofing Shingle Underlayment as eave protection in accordance with manufacturer's instructions.

C. Extend eave protection membrane minimum 24 inches up slope beyond interior face of exterior wall. See drawings for full extent of self-adhered underlayment.

3.4 INSTALLATION – PROTECTIVE UNDERLAYMENT

A. Roof Slopes between 2:12 and 4:12: Apply one layer of "WinterGuard", or equal, over all areas not protected by WinterGuard at eaves, with end and edges weather lapped minimum of 19 inches. Stagger end laps each consecutive layer. Nail in place.

B. Roof Slopes 4:12 or Greater: Install one layer of asphalt felt shingle underlayment perpendicular to slope of roof and lap minimum 4 inches over eave protection.

C. Weather-lap and seal watertight with asphalt roofing cement items projecting through or mounted on roof. Avoid contact or solvent-based cements with WinterGuard , or equal.

3.5 INSTALLATION – VALLEY PROTECTION

A. For "closed-cut," "woven," and "open" valleys, first place one ply of WinterGuard, or equal, minimum 36 inches (910 mm) wide, centered over valleys. Lap joints minimum of 6 inches (152 mm) Follow instructions of shingle an waterproofing membrane manufacturer.

3.6 INSTALLATION – METAL FLASHING

A. Weather-lap joints minimum 2 inches (50 mm).

B. Seal work projecting through or mounted on roof with asphalt roofing cement and make weather tight.

3.7 INSTALLATION- ASPHALT SHINGLES

A. Install shingles in accordance with manufacturer's instructions for product type and application specified.

3.8 FIELD QUALITY CONTROL

A. Field inspection will be performed by the RHA Representative.

B. Visual inspection of the work will be provided by the RHA Representative. If conditions are unacceptable, correct work to the satisfaction of the RHA.

3.9 PROTECTION OF FINISHED WORK

A. Protect finished work until the time of acceptance by the RHA.
B. Do not permit traffic over finished roof surface.

END OF SECTION

SECTION 074243

WOOD PLASTIC COMPOSITE WALL PANELS

PART 1 - GENERAL

A. Provide and install Wood Plastic Composite Deck Skirting.

1.1 SECTION INCLUDES

A. Wood plastic composite (WPC) board cladding for use in commercial rainscreen applications to provide a rear-ventilated façade system (RVFS).

B. Finishing Accessories and Trim

C. Exterior wood plastic composite (WPC) board cladding for use in commercial soffit applications

1.2 RELATED REQUIREMENTS

A. Section 013300 - Submittals.

B. Section 054000 - Cold-Formed Metal Framing. For corrosion-resistant metal furring supporting WPC board cladding.

1.3 COORDINATION

A. Coordinate wood plastic composite siding installation with flashings, trim, and construction of other adjoining work to ensure proper sequencing and to provide a leak-proof, secure, and non-corrosive installation.

1.4 REFERENCES

A. ASTM B117: Standard Practice for Operating Salt Spray (Fog) Apparatus.

B. ASTM C1002: Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

C. ASTM D792: Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.

D. ASTM D1413: Standard Test Method for Wood Preservatives by Laboratory Soil-Block Cultures.

E. ASTM D1761: Standard Test Methods for Mechanical Fasteners in Wood.

F. ASTM D6109: Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastic Lumber and Related Products.

G. ASTM D6341: Standard Test Method for Determination of the Linear Coefficient of Thermal Expansion of Plastic Lumber and Plastic Lumber Shapes Between -30 and 140^0F (34.4 and 60^0C).

H. ASTM D7031: Standard Guide for Evaluating Mechanical and Physical Properties of Wood-Plastic Composite Products.

I. ASTM D7032: Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails).

J. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials.

K. AWPA E1: Laboratory Methods for Evaluating the Termite Resistance of Wood-Based Materials: Choice and No-Choice Tests.

L. AWPA E10: Laboratory Method for Evaluating the Decay Resistance of Wood-Based Materials Against Pure Basidio Mycote Cultures: Soil/Block Test.

M. TAS 201: Impact Test Procedures.

N. TAS 202: Criteria for Testing Impact & Non-Impact Resistant Building Envelope Components Using Uniform Static Air Pressure.

O. TAS 203: Criteria for Testing Products Subject to Cyclic Wind Pressure Loading.

P. UL 723: Standard Test Method for Surface Burning Characteristics of Building Materials.

Q. NFPA 268 - Standard Test Method for Determining Ignitability of Exterior Wall Assemblies Using a Radiant Heat Energy Source

R. ASTM E330 – Standard Tests Methods for Structure Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniformed Static Air Pressure

S. ASTM D1037 – Standard Tests Method For Evaluating Properties of Wood-Base Fiber and Particle Panel Materials.

T. ASTM D6662 – Standard specification for Polyolefin-Based Plastic Lumber Decking Boards

U. ASTM G154 – Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Non-Metallic Materials.

V. ICC-ES-AC92 -16 – Acceptance Criteria for polymer-based, polymer modified and high-pressure laminate exterior and interior wall cladding.

W. CA SFM 12-7A-1 Compliance – Criteria for system testing products for use in Fire Hazard Severity Zones in WUI designated areas of California.

X. Florida DPBR Approval

Y. ICC PER-17111

Z. ICC- ES Evaluation Report ESR-4944

AA. Environmental Product Declaration (EPD) – UNSPSC 30151800, SCS-EPD-08200

BB. Engineering Judgement – Use of WPC Commercial Cladding in Type II buildings up to 40', and Type IV Buildings.

CC. SCS Recycled Content Certification SCS-RC-06376

1.5 DEFINITIONS

A. Rainscreen: An exterior open-joint cladding system incorporating a continuous air cavity created by furring, a water-resistive barrier to manage water intrusion through drainage and ventilation, and a physical air barrier (e.g., sheathing) to prevent air leakage into the building.

B. Closed Loop Production (Manufacturing) Process – Production (manufacturing) processes that reuse material waste created during the production process for additional products, as well as use the recycled products to create new items.

C. WPC: Wood and plastic composite material. Wood plastic composite is panel or lumber product made from recycled plastic and small wood particles or fibers See 2.1 for reference to WPC panel material specified.

1.6 SUBMITTALS

A. General: Comply with Section 013300 - Submittals.

B. Product Data: For each product specified. Include the following:

1. Technical product data, including component descriptions, details, and performance criteria.
2. Manufacturer's printed surface preparation and installation instructions.
3. Safety Data Sheets (SDS).

C. Selection Samples: Full range of samples for color selection. [or as selected by the architect]

D. Verification Samples: For selected color(s). Four-inch-(100-mm-) long by 6-inch (150-mm) wide sample of wood plastic composite cladding.

E. Informational Submittals

1. Product Test Reports: For each product, tests performance by a qualified testing agency
2. Sample Warranty

F. Quality Assurance Submittals:

1. Manufacturer Qualifications
2. Certified test reports showing compliance with specified performance criteria.
3. Specimens copy of specified material warranties.
4. Installer Qualifications

G. Deflection Design: Design calculations, certified by a registered professional engineer, licensed in the State of New York, shall be submitted to verify load carrying capability of panel system.

H. Manufacturer Details: Submit Drawings (. dwg. rvt, and or pdf formats), including plans, sections, showing installation details that demonstrate product dimensions, edge/termination conditions/treatments, corners, openings, and penetrations.

I. Closeout Submittals:

1. Maintenance data for installed system.
1. Submit Environmental Product Declaration (EPD) on the Wood Plastic Composite System.

1.7 QUALITY ASSURANCE

A. All Wood Plastic Composite (WPC) panels specified in this section must be supplied by a company with a minimum of 10 years of experience in the manufacturer and supply of Wood Plastic Composite (WPC) products.

B. Installer Qualifications: A firm with a minimum of three years documented experience installing rear ventilated commercial rainscreen cladding solutions.

C. WPC boards should be manufactured via a close loop production (manufacturing) process (see SCS Recycled Content Certification), where +94% of the raw materials used to manufacture the boards some from recycled materials.

1.8 DELIVERY AND STORAGE

A. General: Deliver and store materials in manufacturer's original packaging and clearly identified. Protect materials from harmful environmental elements, construction dust and other potentially detrimental conditions in a suitable dry, well-ventilated, weathertight storage location.

B. Unload: Unload, store, and erect assembly system components in a manner to prevent bending, warping, twisting and surface damage

C. Storage: Store assembly system components on platforms or pallets, covered with suitable weathertight and ventilated covering.

1.9 ENVIRONMENTAL CONDITIONS

A. Do not apply add rainscreen materials when the air temperature or relative humidity is outside the manufacturer's range limitations.

B. Weather limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of composition siding system to be performance in accordance with manufacturers' written instructions and warranty requirements.

1.10 WARRANTY

A. Manufacturer's Performance Warranty: Manufacturer's written materials warranty for long-term performance against manufacturing defects, including checks, splinters, and delamination, or damage from rot and fungal decay.

    1. Warranty Period: 50 years from date of Substantial Completion.

B. Manufacturer's Stain and Fade Warranty: Manufacturer's written materials warranty for long-term performance against staining and color fade.

    1. Color Fade: Color change from light and weathering exposure not to exceed Delta E (Hunter) units.
    2. Warranty Period: 50 years from date of Substantial Completion.

C. Warranty Provides for the Original Purchaser. See Warranty for detailed information on terms, conditions, and limitations.

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WOOD PLASTIC COMPOSITE WALL PANELS

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Fiberon Cladding. 181 Random Drive New London, NC 20217

B. Basis of Design: Fiberon Wildwood Composite Cladding

C. Composition: Wood and plastic composite (WPC) core boards with "PermaTech," a patented polyethylene-based capping material for superior stain, fade, and scratch resistance. Manufactured through a continuous co-extrusion process. WPC boards should be manufactured via a close loop production (manufacturing) process (see EPD and Recycled content report), where +94% of the raw materials used to manufacture the boards some from recycled materials.

D. Or Approved equals

E. Features
   1. Board Thickness: 0.75 thick capping material.
   2. Board Width: 6 inches with 1/8 inch- (3-mm diameter edges)
   3. Board Length: 20 feet
   4. Water Resistant Barrier for Open Joint Wall Panel Systems: Provide manufacturers standard Water resistant barrier with tear resistant thermo-bonded, non-polyester woven substrate and waterproof acrylic polymeric coating stabilized against oxidation and UV degradation and factory applied adhesive edge strips. Color to match cladding system [or as selected by the architect]
   5. Finishing Accessories and Trim: Provide [manufacturer's standard] [fabricated] trim, angles, and similar components at corners, transitions, and rough openings meeting the performance requirements. Finish to match cladding system
   6. Fasteners: Type 316 stainless steel, self-tapping screws, minimum #9, complying with ASTM C1002 as recommending in writing by wood plastic composite cladding wall panel manufacturer suitable and compatible with system materials.
   7. Color: Koa.

2.2 SECONDARY METAL FRAMING

A. Miscellaneous Metal Framing Rainscreen Components: Cold-Formed Steel Framing
   1. Hat Channels
   2. Sill Channels
   3. Metal Studs

SECTION 07 42 43

WOOD PLASTIC COMPOSITE WALL PANELS

2.3 SOURCE LIMITATIONS

A. Provide components and materials specified in this Section from a single manufacturer for a complete and compatible system assembly

2.4 PERFORMANCE CRITERIA

A. Structural Performance Criteria for WPC Board Cladding Assembly
   1. General: Comply with the New York State Building Code. 2020 Edition.

   2. Provide composition siding system tested in accordance with ASTM E330/E330M and certified to be without permanent deformation or failure of structure members in accordance with design wind velocities for Project geographic location and probability of occurrence based on data from wind velocity maps provided in ASCE 7 an as approved by authorities having jurisdiction (AH)

   3. Wind-Borne Debris Impact Resistance: Cladding assembly tested according to TAS 201, TAS 202, and TAS 203 for High Velocity Hurricane Zone (HVHZ) applications, by an accredited testing laboratory. Passes the specified TAS Test Protocols for large missile impact.

   4. Specific Gravity: 1.10; ASTM D792

   5. Maximum Load Deflection: Less than 0.120 inch; ASTM D7032

   6. Wind Load
      1. Panels shall be designed to withstand the Design Wind Load based upon the local building code. Wind load testing shall be conducted in accordance with ASTM 330 to obtain the following results:
         1) Normal to the plane of the wall between supports, deflection of the secured perimeter-framing members shall not exceed L/175 or ¾", whichever is less.
         2) Normal to the plane of the wall, the maximum panel deflection shall not exceed L/60 of the full span.
         3) Maximum anchor deflection shall not exceed 1/16"
         4) A 1 ½ times design pressure, permanent deflections of framing members shall not exceed L/100 of the span length and components shall not experience failure or gross permanent distortion. At connection points of framing members to anchors, permanent set shall not exceed 1/16".

B. Air Water System Test
   1. If system tests are not available, mock-ups shall be constructed and test performed under the direction of any independent third-party laboratory, which show compliance to the following minimum standards

1. Air Filtration – Where tested in accordance with ASTM E 283, Air infiltration at 1.57 lb./ft^2 must not exceed 0.06 ft/3 min. perf ft^2 of wall area.
2. Water Infiltration – Water infiltration is defined as uncontrolled water leakage through the exterior face of the assembly. Systems shall not be designed to drain any water leakage occurring at the joints. No water infiltration shall occur in any system under a differential static pressure of 6.24 lb./ft^2 after 15 minutes of exposure in accordance with ASTM E 331.

C. Fire Resistant Performance
   1. Surface Burning Characteristics: Maximum 200 Flame Spread Index (Class C) and maximum 350 Smoke Development Index; ASTM E84 and UL 723
   2. Self-Ignition Temperature: not less than 883.9 deg F (473.3 deg C); when tested in accordance with ASTM D1929.
   3. Flash-Ignition Temperature: no less than 754.4 deg F (401.4 deg C): when tested in accordance with ASTM D1929

D. Thermal Movement Performance
   1. Coefficient of Thermal Expansion: 1.67 x 10-5 in/in/deg F, when tested in accordance with ASTM D6341
   2. Modulus of Elasticity: 338,000 psi, when tested in accordance with ASTM D6109
   3. Modulus of Rupture: 4790 psi, when tested in accordance with ASTM D6109.
   4. Creep Recovery: 84 percent average recovery with maximum unrecovered deflection, not to exceed 1/16 inch for 151 lb. test load, when tested in accordance with ASTM 7032

E. Exposure Performance
   1. UV Resistance: Successfully passed after 2000 hours of Xenon-Arc exposure. Tested in accordance with ASTM D2565 Cycle 1.
   2. Fungus Decay Resistance: No significant decay; AWPA E10.
   3. Termite Resistance: Passes; AWPA E1.
   4. Fastener Performance: Minimum 367 lbs.; ASTM D1761.
   5. Delamination: Submersion Test: No delamination after 30 days when tested fully in submerged water at 70 deg F and 150 deg F.
   6. Delamination: High Heat and High Humidity Test: No delamination after 30 days suspended directly above, but not immersed into, 150 deg F water.
   7. Delamination – Soak/Freeze/Thaw Test: No delamination after 50 hours soak/freeze/thaw cycles. Soak in room temperature water, freeze for a minimum 4 hours, thaw and repeat.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide miscellaneous materials as recommended by the RVFS manufacturer.

B. Fasteners: Type 316 stainless steel or polymer-coated composite decking screw fasteners complying with ASTM C1002. Minimum #8 by 2-1/2-inch length for face fasteners and #8 by 2-3/4-inch length for WPC board ends.

1. ACQ Rated Fasteners: Provide fasteners acceptable for alkaline copper quaternary (ACQ) pressure preservative treated wood attachment substrates.
2. Polymer-Coated Screw Fasteners: Comply with ASTM B117 for corrosion-resistance.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions with Installer present, for compliance with requirements for installation tolerances, composition siding system supports, and other conditions affecting performance of the work.

1. Example wall framing to verify that support members and anchorage have been installed with alignment tolerances by composite siding manufacturer.
2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking, and that installation is within flatness tolerances provided by composition siding manufacturer.

B. Verify:

1. Wall sheathing is in place and properly installed.
2. WRB (or air barrier) is in place, continuous, and properly installed.
3. Air cavity is continuous with unobstructed dimension between 3/8 and 3/4 inch (9 and 19 mm) for full height of wood plastic composite cladding.

C. Examine roughing-in for components and systems penetrating composition siding systems to verify actual locations of penetrations relative to seam locations of fabricated wall panel assemblies before installation.

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

3.2 PREPARATION

A. General: Comply with manufacturer's printed installation instructions.

B. Clean substrate services thoroughly prior to installation. Prepare substrate surfaces using methods recommended in writing by cladding support systems manufacturer

C. Prepare subframing and provide anchorage for substrate type and exterior cladding type in accordance with cladding support systems written instructions.

3.3 INSTALLATION

A. General: Comply with open joints for back-ventilated rainscreen system in accordance with manufacturer's printed installation instructions and approved shop drawings

1. Shim or otherwise plumb substrates receiving composition siding system
2. Flash composition siding at perimeter of all openings
3. Locate and space fastenings in uniform vertical and horizontal alignment.
4. Install flashing and trim and wood plastic composite panel work proceeds.
5. Align bottoms of wood plastic composite siding
6. Provide weathertight escutcheons for pipe and conduit penetrating composite siding system.

B. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by fabricated wall panel manufacturer.

C. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.

D. Flashing and Trim: Comply with performance requirements, manufacturers written installation instructions and SMACNA's "Architectural Sheet Metal Manual". Provide concealed fasteners where possible and set units true to line and level. Install work with laps, joints, and seams, that are permanently watertight.

1. Install exposed flashing and trim that is without buckling and tool markets and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to achieve waterproofing performance.
2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 ft. (3m) with no joints allowed within 24 inches (610mm) of corner or intersection. Where lapped expansion provisions cannot be used or work not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

3. Install insect screens to prevent intrusions of pests into air cavity space behind composition siding.

E. Horizontal WPC Board Orientation:

1. Determine and begin at lowest point of cladding installation.
2. Butt joints to occur only over vertical furring and centered on furring. As WPC board courses are added, stagger butt joints in a consistent “stair step” manner.
3. Board lengths to span a minimum of three furring members.
4. Gapping: Provide minimum 3/16 inch spacing between board edges. Spacing at end of boards is temperature dependent; refer to RVFS manufacturer’s published technical data for spacing dimensions.

F. Vertical WPC Board Orientation:

1. Prior to installation, verify required horizontal and vertical furring strips are in place to receive vertically orientated board installation.
2. For walls exceeding available board lengths, separate boards with a non-corrosive metal z-flashing. Allow 1/4-inch clearance between top of lower cladding boards to underside of z-flashing. Maintain 1/2-inch clearance between z-flashing and start of upper cladding boards.
3. Start cladding board installation by first securing the top of the board and then working downward.
4. Using 3/16-inch spacers to maintain gapping, secure the next WPC board course starting from the top and working downward.
5. Where a balanced symmetrical WPC board layout design requires less-than-full-width end boards, maintain a minimum 3-inch width for ripped boards. Increase board-to-board gapping to accommodate; not to exceed 5/16 inch.

G. Diagonal WPC Board Orientation:

1. Prior to installation, verify required horizontal and vertical furring strips are in place to receive diagonally orientated board installation.
2. For walls, soffits or ceilings exceeding available board lengths, separate boards with a non-corrosive metal z-flashing. Allow 1/4-inch clearance between top of lower cladding boards to underside of z-flashing. Maintain 1/2-inch clearance between z-flashing and start of upper cladding boards.
3. Start cladding board installation by first securing the top of the board and then working diagonally downward.
4. Using 3/16-inch spacers to maintain gapping, secure the next WPC board course starting from the top and working downward.
5. Where a balanced symmetrical WPC board layout design requires less-than-full-width end boards, maintain a minimum 3-inch width for ripped boards. Increase board-to-board gapping to accommodate; not to exceed 5/16 inch.

H. Soffit Installation should follow the instructions included in Section 3.3, aligned with the specific orientation desired.

I. Ceiling Installation should follow the instructions included in Section 3.3, aligned with the specific orientation desired.

3.4 CLEANING AND PROTECTION

A. Clean WPC boards according to manufacturer's printed maintenance instructions. Use only cleaning materials and methods acceptable to RVFS manufacturer.

B. Repair any damage to adjacent substrates and surfaces due to work of this Section.

C. Upon completion of RVFS work, protect for remainder of construction period.

END OF SECTION

SECTION 074620

FIBER CEMENT SIDING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fiber cement vertical, lap siding, panels, trim, battens, fascia, and accessories;

B. Factory-finished fiber cement lap siding, panels trim, fascia, molding and accessories;

1.2 RELATED SECTIONS

A. Section 06100 - Rough Carpentry: Wood framing and bracing.

1.3 REFERENCES

A. AS D3359 - Standard Test Method for Measuring Adhesion by Tape Test, Tool and Tape.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

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: Provide detailed drawings of atypical non-standard applications of fiber cement siding materials which are outside the scope of the standard details and specifications provided by the manufacturer.

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

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Minimum of 2 years experience with installation of similar products.

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

1.6 DELIVERY, STORAGE, AND HANDLING

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

B. Store siding on edge or lay flat on a smooth level surface. Protect edges and corners

from chipping. Store sheets under cover and keep dry prior to installing.

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

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 WARRANTY

A. Product Warranty: Limited, non-pro-rated product warranty.
1. HardiPanel HZ10 vertical siding for 30 years.
2. HardieSoffit HZ10 panels for 30 years.
3. HardieTrim HZ10 boards for 15 years.
4. Artisan HZ10 lap siding for 30 years.

B. Finish Warranty: Limited product warranty against manufacturing finish defects.
1. When used for its intended purpose, properly installed and maintained according to Hardie's published installation instructions, James Hardie's ColorPlus finish with ColorPlus Technology, for a period of 15 years from the date of purchase: will not peel; will not crack; and will not chip. Finish warranty includes the coverage for labor and material.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: James Hardie Building Products, Inc., which is located at: 26300 La Alameda Suite 400 ; Mission Viejo, CA 92691; Toll Free Tel: 866-274-3464; Tel: 949-367-4980; Fax: 949-367-4981; Email: request info (info@jameshardie.com); Web: www.jameshardiepros.com.

B. Substitutions: Approved equal.

C. Requests for approval of equal substitutions will be considered in accordance with provisions of Section 016000.

2.2 SIDING AND TRIM

A. HardiePlank HZ10 lap siding, HardiPanel HZ10 vertical siding, HardieSoffit HZ10 panels and HardieShingle HZ10 siding requirement for materials:
1. Fiber-cement siding - complies with ASTM C 1186 Type A Grade II.
2. Fiber-cement siding - complies with ASTM E 136 as a noncombustible material.
3. Fiber-cement siding - complies with ASTM E 84 Flame Spread Index = 0, Smoke Developed Index = 5.

B. Artisan HZ10 lap siding requirement for Materials:

1. Fiber-cement siding - complies with ASTM C 1186 Type A Grade II.
2. Fiber-cement siding - complies with ASTM E 136 as a noncombustible material.
3. Fiber-cement Siding - complies with ASTM E 84 Flame Spread Index = 0, Smoke Developed Index = 5.

C. Lap Siding: Artisan HZ10 Lap Siding as manufactured by James Hardie Building Products, Inc.
   1. Type: Texture 7-1/4 inches (184 mm) with 6 inches (152 mm) exposure.

2.3 FASTENERS

A. Wood Framing Fasteners:
   1. Wood Framing: 4d common corrosion resistant nails.
   2. Wood Framing: 6d common corrosion resistant nails.
   3. Wood Framing: 8d box ring common corrosion resistant nails.

B. Masonry Walls attachment:
   1. Masonry Walls: Aerico Stud Nail, ET&F ASM No.-144-125, 0.14 inch (3.6 mm) shank by 0.30 inch (7.6 mm) head by 2 inches (51 mm) long corrosion resistant nails.

2.4 FINISHES

A. Factory Primer: Provide factory applied universal primer.
   1. Primer: Factory primed by James Hardie.
   2. Product: ColorPlus Technology by James Hardie.
   3. Definition: Factory applied finish; defined as a finish applied in the same facility and company that manufactures the siding substrate.
   4. Process:
      a. Factory applied finish by fiber cement manufacturer in a controlled environment within the fiber cement manufacturer's own facility utilizing a multi-coat, heat cured finish within one manufacturing process.
      b. Each finish color must have documented color match to delta E of 0.5 or better between product lines, manufacturing lots or production runs as measured by photospectrometer and verified by third party.
   5. Protection: Factory applied finish protection such as plastic laminate that is removed once siding is installed
   6. Accessories: Complete finishing system includes pre-packaged touch-up kit provided by fiber cement manufacturer. Provide quantities as recommended by manufacturer.
   7. Color: Boothbay Blue JH70-20.

PART 3 EXECUTION

3.1 EXAMINATION

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

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

C. Nominal 2 inch by 4 inch (51 m by 102 mm) wood framing selected for minimal shrinkage and complying with local building codes, including the use of water-resistive barriers or vapor barriers where required. Minimum 1-1/2 inches (38 mm) face and straight, true, of uniform dimensions and properly aligned.
   1. Install water-resistive barriers and claddings to dry surfaces.
   2. Repair any punctures or tears in the water-resistive barrier prior to the installation of the siding.
   3. Protect siding from other trades.

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. Install a water-resistive barrier is required in accordance with local building code requirements.

D. The water-resistive barrier must be appropriately installed with penetration and junction flashing in accordance with local building code requirements.

E. Install Engineered for Climate HardieWrap weather barrier in accordance with local building code requirements.

F. Use HardieWrap Seam Tape and joint and laps.

G. Install and HardieWrap flashing, HardieWrap Flex Flashing.

3.3 INSTALLATION - HARDIEPLANK HZ10 LAP SIDING,

A. Install materials in strict accordance with manufacturer's installation instructions.

B. Starting: Install a minimum 1/4 inch (6 mm) thick lath starter strip at the bottom course of the wall. Apply planks horizontally with minimum 1-1/4 inches (32 mm) wide laps at the top. The bottom edge of the first plank overlaps the starter strip.

C. Allow minimum vertical clearance between the edge of siding and any other material in strict accordance with the manufacturer's installation instructions.

D. Align vertical joints of the planks over framing members.

E. Butt joints must not fall within 4 inches (102 mm) of a stud. Do not nail within 2 inches (51 mm) of the end of planks.

F. Maintain clearance between siding and adjacent finished grade.

G. Locate splices at least one stud cavity away from window and door openings.

H. For proper fastener selection and fastening schedules for various wind load requirements and framing options, refer to the Technical Data Sheet at www.aspyredesign.com.

I. Face nail to sheathing.

J. Locate splices at least 12 inches (305 mm) away from window and door openings.

3.4 INSTALLATION - HARDIEPANEL HZ10 VERTICAL SIDING

A. Install materials in strict accordance with manufacturer's installation instructions.

B. Block framing between studs where HardiePanel siding horizontal joints occur.

C. Install metal Z flashing and provide a 1/4 inch (6 mm) gap at horizontal panel joints.

D. Place fasteners no closer than 3/8 inch (9.5 mm) from panel edges and 2 inches (51 mm) from panel corners.

E. Allow minimum vertical clearance between the edge of siding and any other material in strict accordance with the manufacturer's installation instructions.

F. Maintain clearance between siding and adjacent finished grade.

G. Specific framing and fastener requirements refer to Tables 2 and 3 in National Evaluation Service Report No. NER-405.

H. Factory Finish Touch Up: Apply touch up paint to cut edges in accordance with manufacturer's printed instructions.
   1. Touch-up nicks, scrapes, and nail heads in pre-finished siding using the manufacturer's touch-up kit pen.
   2. Touch-up of nails shall be performed after application, but before plastic protection wrap is removed to prevent spotting of touch-up finish.
   3. Use touch-up paint sparingly. If large areas require touch-up, replace the damaged area with new pre-finished siding. Match touch up color to siding color through use of manufacturer's branded touch-up kits.

3.5 INSTALLATION - HARDIETRIM HZ10 BOARDS

A. Install materials in strict accordance with manufacturer's installation instructions. Install flashing around all wall openings.

B. Fasten through trim into structural framing or code complying sheathing. Fasteners must penetrate minimum 3/4 inch (19 mm) or full thickness of sheathing. Additional

fasteners may be required to ensure adequate security.

C. Place fasteners no closer than 3/4 inch (19 mm) and no further than 2 inches (51 mm) from side edge of trim board and no closer than 1 inch (25 mm) from end. Fasten maximum 16 inches (406 mm) on center.

D. Maintain clearance between trim and adjacent finished grade.

E. Trim inside corner with a single board trim both side of corner.

F. Outside Corner Board Attach Trim on both sides of corner with 16 gage corrosion resistant finish nail 1/2 inch (13 mm) from edge spaced 16 inches (406 mm) apart, weather cut each end spaced minimum 12 inches (305 mm) apart.

G. Allow 1/8 inch gap between trim and siding.

H. Seal gap with high quality, paint-able caulk.

I. Shim frieze board as required to align with corner trim..

J. Fasten through overlapping boards. Do not nail between lap joints.

K. Overlay siding with single board of outside corner board then align second corner board to outside edge of first corner board. Do not fasten HardieTrim boards to HardieTrim boards. Use solid wood blocking.

L. Shim frieze board as required to align with corner trim.

M. Install HardieTrim Fascia boards to rafter tails or to sub fascia.

3.6 FINISHING

A. Finish unprimed siding with a minimum one coat high quality, alkali resistant primer and one coat of either, 100 percent acrylic or latex or oil based, exterior grade topcoats or two coats high quality alkali resistant 100 percent acrylic or latex, exterior grade topcoat within 90 days of installation. Follow paint manufacturer's written product recommendation and written application instructions.

B. Finish factory primed siding with a minimum of one coat of high quality 100 percent acrylic or latex or oil based exterior grade paint within 180 days of installation. Follow paint manufacturer's written product recommendation and written application instructions.

3.7 PROTECTION

A. Protect installed products until completion of project.

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

END OF SECTION

SECTION 077123

GUTTERS AND DOWNSPOUTS

PART 1 GENERAL

1.01 SUBMITTALS

A. Product Data: Catalog sheets, specifications, and installation instructions for the following:
   1. Gutters.
   2. Gutter hanger bracket.
   3. Downspouts.
   4. Sealant.

PART 2 PRODUCTS

2.01 MATERIALS

A. Gutter: Free floating box or K style, .032 gage aluminum, 5 inch wide seamless gutter.

B. Fascia Cleat (Surface Mounted): Gutter manufacturer's continuous aluminum fascia cleat designed for attachment directly to the fascia board.

C. Gutter Hanger Brackets: Gutter manufacturer's aluminum hanger brackets designed to span across the top of the gutter forming a spreader and stiffener bar. Equal to:
   1. US Aluminum Hangers. Model. AM5ZIP500. Aluminum 5” Zip Hanger. Screw attached.

D. Downspout: 3 x 4 inch corrugated, .027 gage aluminum, in 12 foot lengths. Connect to drain hub.

E. Downspout Strap: Downspout manufacturer's standard strap.

F. Finish:
   1. Baked on enamel. Color to match siding. Shop applied
   2. Accessories: Gutter manufacturer's standard or recommended sealant, pop rivets, screws, and bolts.

G. Install Gutter Guard over all gutters equal to:
   1. Amerimax Home Products.
      a. Solid 4 ft. White Vinyl Surface Tension Gutter Guard.

PART 3 EXECUTION

3.01 INSTALLATION

A. Unless shown or specified otherwise, install the gutter system in accordance with the manufacturer's installation instructions.

B. Install continuous fascia cleat.
   1. Secure the fascia cleat to the fascia board with aluminum nails 6 inches oc.
   2. Secure the fascia cleat to the roof deck with aluminum nails 6 inches oc.

C. Trim the top front and back edges of one end of each gutter section so the sections will overlap each other 2 inches and nest snugly together. Before joining sections together, apply sealant between the mating surfaces.

D. Install gutter brackets 3 feet on center.
   1. Lock the front of the bracket to the gutter edge and secure the other end to the fascia board with aluminum screws.
   2. Lock the front of the bracket to the gutter edge and secure the other end to the roof deck with aluminum screws.

E. Install gutter end pieces, mitered corners, and drop tubes. Apply sealant between mating surfaces and secure with pop rivets.

F. Install downspouts with end joints that telescope a minimum of 1-1/2 inches.

G. Install necessary offsets and elbows.

H. Install a minimum of 2 straps at each downspout section. Fasten downspouts to straps with pop rivets.

I. Secure straps to masonry or concrete wall with machine bolts in lead shields.

J. Secure straps to wood walls with screws.

K. Discharge Elbows: Fasten leader shoes to downspouts with pop rivets.

END OF SECTION

SECTION 079200

JOINT SEALANTS

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. Silicone joint sealants.
2. Urethane joint sealants.
3. Latex joint sealants.
4. Fire Stop Caulk

1.3 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

C. Product Testing: T joint sealants using a qualified testing agency.

1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.
2. Test according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C 920 for adhesion and cohesion under cyclic movement, adhesion-in-peel, and indentation hardness.

1.5 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.

2. When joint substrates are wet.

3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.

4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.6 WARRANTY

A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.

2. Disintegration of joint substrates from natural causes exceeding design specifications.

3. Mechanical damage caused by individuals, tools, or other outside agents.

4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

C. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

D. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50, for Use NT.

1. Products: Subject to compliance with requirements, provide the following:

a. Dow Corning Corporation; 756 SMS.

b.

B. Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

1. Products: Subject to compliance with requirements, provide the following::

a. Dow Corning Corporation; 786 Mildew Resistant.

2.3 URETHANE JOINT SEALANTS

A. Single-Component, Pourable, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type S, Grade P, Class 25, for Use T.

1. Products: Subject to compliance with requirements, provide the following:

a. BASF Building Systems; Sonolastic SL 1.

2.4 LATEX JOINT SEALANTS

A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

1. Products: Subject to compliance with requirements, provide one of the following:

a. BASF Building Systems; Sonolac.

b. Bostik, Inc.; Chem-Calk 600.

c. Tremco Incorporated; Tremflex 834.

2. 5 FIRESTOP SEALANT.

A. Joint-Sealant Application: Equal to: 3M. Corp. Mfr. Model # CP-25WB+10. install all around pipes in Basement Utility Room, Kitchen and Bathroom piping.

2.6 JOINT SEALANT BACKING

B. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

C. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.7 MISCELLANEOUS MATERIALS

E. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

F. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or

harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

G. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

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

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

    a. Concrete.

    b. Masonry.

    c. Drywall.

3. Remove laitance and form-release agents from concrete.

4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

5.

a. Metal.

b. Glass.

c. Porcelain enamel.

d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.

2. Do not stretch, twist, puncture, or tear sealant backings.

3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.

2. Completely fill recesses in each joint configuration.

3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.

2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.

3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.

4. Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.

a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

G. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations.

3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.6 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.

1. Joint Locations: at exterior door.

a. Isolation and contraction joints in cast-in-place concrete slabs.

b. Joints between plant-precast architectural concrete paving units.

c. Tile control and expansion joints.

d. Joints between different materials listed above.

e. Other joints as indicated.

2. Urethane Joint Sealant: Single component, pourable, traffic grade.

B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal non-traffic surfaces.

1. Joint Locations:

a. Control and expansion joints in unit masonry.

b. Joints between different materials listed above.

c. Perimeter joints between materials listed above and frames of doors, windows, and louvers.

d. Control and expansion joints in ceilings and other overhead surfaces.

2. Silicone Joint Sealant: Single component, nonsag, neutral curing, Class 50**.**

C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.

1. Joint Locations:

a. Isolation joints in cast-in-place concrete slabs.

b. Control and expansion joints in tile flooring.

c. Other joints as indicated.

2. Urethane Joint Sealant: Single component, pourable, traffic grade.

D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.

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JOINT SEALANTS

1. Joint Locations:

    a. Control and expansion joints on exposed interior surfaces of exterior walls.

    b. Perimeter joints of exterior openings where indicated.

    c. Vertical joints on exposed surfaces of interior unit masonry walls and partitions.

    d. Perimeter joints between interior wall surfaces and frames of interior doors, and windows.

    e. Other joints as indicated.

2. Joint Sealant: Latex.

E. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Sealant Location:

    a. Joints between plumbing fixtures and adjoining walls, floors, and counters.

    b. Tile control and expansion joints where indicated.

2. Joint Sealant: Single component, nonsag, mildew resistant, acid curing.

END OF SECTION

SECTION 08 5113

ALUMINUM WINDOWS

PART 1 GENERAL
1.1 SUMMARY

A. Section Includes:
1. Aluminum framed windows, with operable sash.
2. Shop glazing.
3. Operating hardware and insect screens.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
2. Division 01: Section 01 4000 for Quality Requirements.
3. **Division 08: Section 08 5656 for window security screens to be mounted directly to aluminum windows.**

1.2 REFERENCES

A. American Architectural Manufacturers Association (AAMA) (www.aamanet.org):
1. CW-10 - Care and Handling of Architectural Aluminum from Shop to Site.
2. 611 - Voluntary Specification for Anodized Architectural Aluminum.
3. 1503.1 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
4. 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Architectural Extrusions and Panels.
5. 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Architectural Extrusions and Panels.
6. 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Architectural Extrusions and Panels.

B. American Architectural Manufacturers Association/Window and Doors Manufacturers Association/Canadian Standards Association (AAMA/WDMA/CSA) (www.aamanet.org) 101/I.S.2/A440 - Standard/Specification for Windows, Doors and Unit Skylights.

C. American Society of Civil Engineers (ASCE) (www.asce.org) 7 - Minimum Design Loads for Buildings and Other Structures.

D. ASTM International (ASTM) (www.astm.org):
08 5113-1 Aluminum Windows
1. B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
2. D3656 - Standard Specification for Insect Screening and Louver Cloth Woven from Vinyl-Coated Glass Yarns.

3. E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors.
4. E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform or Cyclic Static Air Pressure Difference.
5. E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights.
6. F588 - Standard Test Method for Resistance of Window Assemblies to Forced Entry Excluding Glazing.

E. Energy Star (www.energystar.gov) - Qualified Products.

F. National Fenestration Rating Council (NFRC) (www.nfrc.org) 100 - Procedures for Determining Fenestration Products U-Factors.

1.3 SYSTEM DESCRIPTION

A. Windows: AAMA/WDMA/CSA 101/I.S.2/A440.

1. Product type: Single Hung.
2. Performance Rating: CW-PG50.
3. Air Infiltration Test: Not to exceed .05 cfm/sf in accordance with ASTM E 283.
4. Water Resistance Test: Not uncontrolled water leakage using a static pressure of 7.52 psf in accordance with ASTM E 331 and ASTM E 547.
5. Uniform Load Structural Test: No glass breakage, permanent damage of fasteners, hardware parts or any other damage causing the window to be inoperable at 75.19 psf in accordance with ASTM E 330.
6. Operating Force: Movable sash shall operate in either direction with a force of 34 lbf in accordance with ASTM E 2068.

B. Design Requirements; design windows to withstand:

1. Wind loads in accordance with the 2015 International Building Code of New York State.
2. Movement caused by an ambient temperature range of 120 degrees F and a surface temperature range of 160 degrees F.
3. Movement between system and adjacent construction.
4. Dynamic loading and release of loads.
5. Deflection of supports.
6. Overhead structure deflection of 1/4-inch.

1.4 SUBMITTALS

A. Submittals for Review:

1. Shop Drawings: Include locations, elevations, sections, materials, finishes, and attachments.
2. Samples:
    a. Window corner, minimum 12 x 12-inches, showing corner construction, cross section, and finish.

b. 3 x 3-inch finish samples in specified color.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Minimum 5 years documented experience in work of this Section.
B. Conform to applicable accessibility code for locating hardware.
C. Mockup:
1. Size: One full sized window unit.
2. Locate where directed on ground floor with security screen.
3. Approved mockup may remain as part of the Work.
4. See Section 01 4000 for further requirements.

1.6 WARRANTY

A. Window: Two (2) years.
B. Window hardware: Five (5) years.
C. Window finish: Fifteen (15) years.
D. Insulated glass: Five (5) years.

1.7 EXTRA MATERIALS

A. Provide the following:
1. Bottom (operable) sashes; 2 for each window type.
2. Top (fixed) sashes; 2 for each window type.
3. Dual, self aligning sweep locks; 32 total.
4. Sash balances; 32 total.
5. Sash catch; 32 total.

1.8 DELIVERY, STORAGE AND HANDLING

A. Handle products in accordance with AAMA CW-10.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
1. Quaker Windows and Doors. (www.QuakerCommercialWindows.com)
a. Model E300-SH, thermally broken, tilt sash and 3-1/4-inch frame depth.
2. Or approved equal.

2.2 MATERIALS

A. Aluminum Extrusions:
1. All extruded sections shall be of 6063-T6 aluminum. Alloy and temper recommended by window manufacturer for strength, corrosion resistance, and

application of required finish, but no less than 22,000 psi ultimate tensile strength, a yield of 16,000 psi. Comply with ASTM B 221.
a. 0.062-inch wall thickness for frame and sash.

B. Glass and Glazing Accessories:
1. All units shall be glazed at the factory as follows;
a. 1-inch minimum thickness.
b. Two (2) lites of tempered 3/16-inch clear glass.
c. Low-E coating plus Argon.
d. U-Factor: 0.32.
e. SHGC: NR.

C. Operating Hardware:
1. Aluminum, stainless steel, or other noncorroding material compatible with aluminum.
2. Single hung windows: Class 5, concealed block and tackle balancers. Block & Tackle shall conform to AAMA 902 and of appropriate size and capacity to hold operable sash stationary in any open position shall be used. Sash balances shall be easily **accessible and replaceable in the field without the use of special tools.**
3. Primary sash locks: Dual, self aligning sweep locks. Cast or white bronze, plastic or die cast not permitted.
4. Limited travel latch.

D. Thermal Break:
1. The thermal barrier shall provide a continuous uninterrupted thermal break around the entire perimeter of the frame and all panels and shall not be bridged by any metal conductors.

2.3 ACCESSORIES
A. Fasteners: Stainless steel, hot-dip galvanized steel, or fluoropolymer coated steel; type best suite to application.
B. Weatherstripping: Double weatherstripping using silicone-coated woven pile with polypropylene fin center where specified with AAMA 701.
C. Insect Screens:
1. Screen frames shall be extruded aluminum.
2. Aluminum 18 x 14 mesh.

D. Security Screens:
1. See Section 08 5656 - Window Security Screens.

E. Limit Stops: Resilient rubber.

2.4 FABRICATION
A. Fabricate to AAMA/WDMA/CSA 101/I.S.2/A440.

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ALUMINUM WINDOWS

B. Window Members: All window members, including grille bars, shall be of aluminum.
   1. All aluminum main frame extrusions shall have a minimum wall thickness of 0.062.
   2. Depth of frame and sash shall not be less than 2 3/8".

C. Assembly: The windows shall be assembled in a secure and workmanlike manner to perform as hereinafter specified. All joints of the main frame and the sash shall be butt type, coped and joined neatly and secured by means of screws anchored in integral ports. The main frame at the sill and head shall be sealed on the underside with a narrow joint sealant meeting AAMA 803.3 specification for Narrow Joint Sealants.

D. Sash Construction: The sash shall be of butt construction mechanically joined so that they may be easily repaired. The meeting rails of the top and bottom sash shall interlock in the closed position. The meeting rail interlock shall consist of two separate and distinct metal interlocks containing fin seal weatherstripping as an Integral part of both metal interlocks.

E. Fabricate with minimum clearances and shim spaces around perimeter, yet enabling installation and dynamic movement.

F. Accurately fit and secure joints and intersections. Make joints flush, hairline, and weathertight.

G. Fabricate aluminum components with integral low conductance thermal barrier located between exterior and interior exposed components that eliminates metal-tometal contact.

H. Conceal fasteners and attachments from view.

I. Reinforce corners and intersections of frames and mullions.

J. Provide internal drainage weep holes and channels to route moisture to exterior.

K. Form glass stops, exterior sills, closures, weatherstops, and flashings of same material as frame.

2.5 FINISHES

A. Aluminum (Windows): ANSA/AAMA 2605 powder coat finish.
   1. Color to be selected from light range including, but not limited to Creme, Beige, Bone, Oyster, Wicker, etc...

B. Security Screens: Shall match aluminum above.

C. Insect Screens: Color to be selected from manufacturer's full color range.

D. Hardware: To be selected from manufacturer's full color range.

PART 3 EXECUTION
3.1 INSTALLATION

A. Comply with manufacturer's specifications and recommendations for installation of window units, hardware, operators and other components of work. In no case shall attachment to existing structure or to components of the window system be through or debridge the thermal barriers of the replacement windows.

B. Set units plumb, level and true to line, without warp or rack of frames or sash. Anchor securely in place. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action. Windows must be securely blocked and fastened.

C. Wedge insulation between frames of new windows and construction to remain, or between frames and new blocking as applicable. Compress fiberglass to not less than 50 percent of original thickness.

D. Set sill members and other members in bed of compound, or with joint filler or gaskets, to provide weathertight construction. Seal units following installation and as required to provide a weathertight system.

E. Fasteners: Aluminum, stainless steel, or other materials warranted by manufacturer to be non-corrosive and compatible with aluminum window members, hardware and other components of the windows.

3.2 FIELD TESTING AND QUALITY CONTROL

A. Field Testing: The Owner will engage a qualified independent testing agency to perform the testing indicated.
   1. Test aluminum windows for compliance with requirements specified for performance and test methods. Conduct tests using specimen representative of proposed materials and construction including perimeter components according to AAMA 502.2 recommendations. Window shall be tested in accordance with AAMA 502-12 - Voluntary Specification for Field Testing of Newly Installed Fenestration Products.
   2. The proposed window will not be accepted without successfully passing field testing. Testing shall be done for the mock-up and at the midpoint of the construction.
   3. In the event of failure or non compliance, the contractor shall be responsible for any and all corrective measures.
      a. If test area fails to meet specified air or water infiltration testing:
      1. Submit description of proposed remedial work to Owner and Architect.
      2. Complete remedial work on test specimen and repeat testing. Retesting shall be at the expense of the contractor.
      3. When test results meet specified requirements, incorporate remedial work into other work on Project.
      4. Additional location(s) for field testing may be required.

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ALUMINUM WINDOWS

3.3 OPERATION AND MAINTENANCE

A. Adjust operating sash and hardware to provide tight fit at contact points and at weatherstripping. Adjust also for smooth operation and a weathertight closure.

B. Clean aluminum surfaces promptly after installation of windows, exercising care to avoid damage to the finish. Remove excess glazing and sealant compound, dirt and other substances.
1. Lubricate hardware and moving parts
2. For frame and sash cleaning, use a common window cleaner or mild detergent solution with a regular cloth. After cleaning, be sure to thoroughly rinse all surfaces with clean water to remove any detergent residue.

C. Clean glass promptly after installation of windows. Remove glazing and sealant compound, dirt and other substances.
1. Use a common window cleaner with a lint-free cloth or chamois.
2. Do Not Use:
   a. Caustic or abrasive cleaner or any silicon-based solvents on the frame or sash surfaces, as they may damage or discolor the finish
   b. Petroleum-based lubricants as they may discolor the finish
   c. Insecticides (bug spray) on or near window surface. Contact of insecticides with the finish could damage or discolor the window surface.

D. Initiate all protection and other precautions required to ensure that window units will be without damage or deterioration at time of acceptance.

END OF SECTION

SECTION 08 5656

SECURITY WINDOW SCREENS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Window security screens on first floor.

1.2 RELATED SECTIONS

A. Section 08 5113 - Aluminum Windows.

1.3 SUBMITTALS (USING PROCORE MANAGEMENT SOFTWARE)

A. Manufacturer shall submit shop drawings, showing details of attachment to surround materials and elevations showing scope of the project.
B. Samples of materials may be requested without cost to owner: frame sections, infill sections, fasteners, corner section, etc.

1.4 WARRANTY

A. Two (2) year warranty against any proven defective material or parts, as called for in the specifications and approved shop drawings. This warranty does not cover abuse by others.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Quaker Windows and Doors. (www.QuakerCommercialWindows.com)
B. Kane Manufacturing Corp. (www.kaneinnovations.com)
C. Or approved equal.

2.2 SECURITY SCREEN DESCRIPTION

A. Level 4, medium vandalism, operable top hinged.

2.3 MAIN FRAME

A. The main frame shall be not less than 1-inch x 1-1/2-inch wide, double hollow, “L” shape and extruded from 6063-T6 aluminum alloy. Weight shall be not less than .410 lbs/ft., with a nominal thickness of .075- inch. The corners of the main frame shall be mitered, fitted with an internal tension coupling assembly and fastened.
08 5656-1 Security Window Screens.

B. The screen frame shall have an integral groove for the retention of a combination cushioning strip/insect shield.

C. A removable concealment plate, extruded from 6063-T6 aluminum alloy shall be attached to the main frame using tamper resistant screws. Weight shall be not less than .068 lbs./ft. with a nominal thickness of .050-inch.

2.4 FINISH / COLOR

A. The main frame shall be thoroughly cleaned in a 5-step bonderizing process. An electrostatically applied thermoplastic, polyester powder coating (2.5 mil min. thickness) shall be applied and baked to a hard mar-resistant finish. Coating shall meet or exceed AAMA 2605.

1. To be selected by the RHA to match the primary window color.

B. The concealment plate shall be thoroughly cleaned in a 5-step bonderizing process. An electrostatically applied black, thermoplastic, polyester powder coating (2.5 mil min. thickness) shall be applied and baked to a hard mar-resistant finish. Coating shall meet or exceed AAMA 2605.

C. The Infill shall be thoroughly cleaned in a 5-step bonderizing process. An electrostatically applied black, thermoplastic, polyester powder coating (2.5 mil min. thickness) shall be baked to a hard mar-resistant finish.

2.5 INFILL

A. Wire Cloth

1. Wire cloth shall be woven 12-mesh to the inch from .028 diameter Type 304 stainless steel wire and double crimped.

2.6 INFILL ATTACHMENT

A. The infill shall be retained by a removable concealment plate and tamper-resistant screws.

B. Tamper-resistant screws shall penetrate the concealment plate, infill and main frame approximately 4” on center.

2.7 EMERGENCY EGRESS RELEASE

A. Each screen shall have two stainless steel spring loaded slide/lock bolts for emergency egress from the inside.

SECTION 08 5656

SECURITY WINDOW SCREENS

2.8 HARDWARE

A. Each screen shall have an aluminum continuous piano hinge, 2-inch open, .060-inch thickness with a 1/8-inch diameter stainless steel pin, attached to the main frame at the head with tamper resistant screws. An electrostatically applied thermoplastic, polyester powder coating (2.5 mil min. thickness) shall be applied and baked to a hard mar-resistant finish.

B. Each screen shall come fully assembled and tested at the factory for operation.

PART 3 EXECUTION
3.1 INSPECTION

A. Verify that openings fit allowable tolerances are plumb, level, provide a solid anchoring surface and comply with approved shop drawings.

3.2 INSTALLATION

A. Install in factory on primary windows specified in Section 08 5113. Install in accordance with approved shop drawings and specifications.

1. The contractor shall have the option to provide security screens mounted independently in masonry and other openings. Independent security screens shall be provided with all frames and components for such mounting. All requirements of this section shall apply.

B. Plumb and align faces in a single plane and erect screens square and true, adequately anchored to structure.

C. After completion of installation, screens shall be adjusted, in working order and cleaned.

END OF SECTION

SECTION 0871 00

DOOR HARDWARE

PART 1 – GENERAL

1.01 SUMMARY

A. Exterior Door Hardware

1.02 SUBMITTALS

A. Submit in accordance with Conditions of the Contract and Division 1 Administrative Requirements.

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

C. Upon door hardware submittal approval, furnish for each electrified opening, three copies of point to point diagrams.

PART 2 – PRODUCTS

3.01 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.

3.02 HARDWARE SET SCHEDULE

A. Guide: Door hardware items have been placed in sets which are intended to be a guide of design, grade, quality, function, operation, performance, exposure, and like characteristics of door hardware, and may not be complete. Provide door hardware required to make each set complete and operational.

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

C. 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.

SECTION 0871 00

DOOR HARDWARE

3.03 HARDWARE SCHEDULE - for installation

Heading 1

Openings: 1,2,3,4 - Exterior Front Doors (Street Side)

1.	Kickplates	Ives Commercial 840028430. 4" x 30" Kick Plate Aluminum Finish. Item #: 840028430
2.	Locks	Accent Single Cylinder Keyed Entry Door Lever Set and Deadbolt Combo – Best Locks. Aged Bronze
3	Hinges	Hager Stainless Steel Door Hinge BB1541 4 x 4 US32D Satin Stainless, Square Corners, Full Mortise, Residential
4.	Door Jamb reinforcement	Defender Security U 10385 Door Strike. Satin Finish

Heading 2

Opening: 5,6,7,8 - Exterior Rear Deck Door (Parking Lot Side)

2.	Kickplates	Ives Commercial 840028430. 4" x 30" Kick Plate Aluminum Finish. Item #: 840028430
1.	Locks	Accent Single Cylinder Keyed Entry Door Lever Set and Deadbolt Combo Best Locks. Aged Bronze
3	Hinges	Hager Stainless Steel Door Hinge BB1541 4 x 4 US32D Satin Stainless, Square Corners, Full Mortise, Residential
1	Door Jamb reinforcement	Defender Security U 10385 Door Strike. Satin Finish.

Heading 3

Opening 1 - Storm Doors

Qty.	Type	Description	Finish
3.	Storm Door	Pre-hung	White

END OF SECTION

SECTION 081410

DOORS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Exterior doors

B. Storm Door.

1.2 SUBMITTALS

A. Product Data: Submit door manufacturer current product literature, including installation instruction.

B. Quality Assurance Submittals

1. Manufacturer Instructions: Provide manufacturer's written installation instructions.

1.3 DELIVERY, STORAGE AND HANDLING

A. Deliver doors, materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.

B. Store doors as recommended by manufacturer.

1.4 WARRANTY

A. Manufacturer standard warranty indicating that doors will be free from material and workmanship defects from the date of substantial completion for the time periods indicated below:

1. Door System: 5 Years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

2.2 PREHUNG EXTERIOR DOOR

A. Exterior Exit door:

1. Equal to: Pella.

   a. 36-in x 80-in Fiberglass Craftsman Right-Hand Inswing Sage Painted Single Front Door with Brickmould Insulating Core. Model #1000009362

   b. Include aluminum threshold (pre-hung door unit). Color: satin aluminum. Exterior trim shall be 1 x 4 trim equal to LP Smart Side exterior trim boards for new door. Paint: to match exterior trim.

B. Storm Door: Install Storm door on new exit door. Door shall be equal to:

1. Door shall be equal to: Emco. 100 Series pre-hung storm door, with spring loaded closer. Color: White with self storing screen. 36" x 80".

2.3 DOOR FINISHES

A. Painted: Semi gloss- (See also Painting). Paint all exterior doors.

B. Surface Texture: Smooth

PART 3 - EXECUTION

3.1 GENERAL

A. Install doors in accordance with manufacturer's installation guidelines and recommendations.

3.2 EXAMINATION

A. Inspect door prior to installation.

B. Inspect rough opening for compliance with door manufacturer recommendations. Verify rough opening conditions are within recommended tolerances.

3.3 PREPARATION

A. Prepare door for installation in accordance with manufacturer's recommendations.

3.4 INSTALLATION

A. Place door unit into opening and level hinge side of jamb. Use shims fastened through jamb and stop to level and temporarily secure in place.

B. Level latch side of jamb. Use shims fastened through jamb and stop to level and temporarily secure in place.

C. Verify spacing between jamb and door is uniform on all sides. Adjust as necessary.

D. Shim top of jamb in center of opening and fasten with nail.

E. Re-check for square, level and even spacing around door. Nail securely in place through stop, jamb, shims and into studs every 12 inches.

F. Set nails.
   a. Install trim on both sides using nails every 12 to 16 inches.

END OF SECTION

SECTION 099100

PAINTING

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 surface preparation and the application of paint systems on the following interior and exterior substrates:
   1. Interior Gypsum Board affected by window and door replacement.
   2. Interior and exterior surfaces of Exterior doors and trim.
   3. Galvanized metal doors.
   4. Necessary touch up with matching shop applied paint.

B. Paint Preparation: Inspect all walls for holes, or unfinished drywall. Clean and patch all walls prior to painting.

C. All exterior Cement Board shall be factory painted. Touch up only for exterior siding.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Samples: For each type of paint system and each color and gloss of topcoat.

C. Contractor note: Allow 7 paint colors in base bid.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Benjamin Moore & Co.
   2. Sherwin-Williams Company
   3. Behr
   4. Approved equal.

B. Products: Subject to compliance with requirements, products listed shall be approved by the Rochester Housing Authority for the basis of design.

2.2 PAINT, GENERAL

A. Material Compatibility:
   1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
   2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

B. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.

C. Colors: As selected by Architect from manufacturer's full range.

2.3 PRIMERS

A. Exterior Trim Primer:
   1. Zissner; Perma-White Mold & Mildew-Proof White Semi-Gloss Exterior Paint
      a. Applied at a dry film thickness of not less than 3.0 mils.

B. Interior window and door trim of affected exterior doors.
   1. For doors: White base semi-gloss interior trim paint.
      Color: White.
   2. For all interior trim.

C. Gypsum Board Primer and finish coat:
   1. Sherwin-Williams; PrepRite 200 Latex Wall Primer B28W200 Series:
   2. Interior ceilings: Equal to Behr. Premium Plus. White Ceiling. Flat finish.

D. Galvanized Metal Primer: (Exterior metal doors)
   1. Sherwin-Williams; DTM Acrylic Primer/Finish B66W1: Applied at a dry film thickness of not less than 2.5 mils.
   2. Paint inside and out, including door frames.

2.4 FINISH COATS

A. Low VOC paint materials. Paint walls equal to (Manufacturer listed) All interior painting shall be one coat primer, and two finish coats. Paint for trim frames shall be semi-gloss finish. Allow two colors for bidding purposes (not including white for ceilings).

A. Interior (affected) drywall:
   1. Sherwin -Williams; ProMar 200 Interior Latex satin finish. (2 coats).
      a. Applied at a dry film thickness of not less than 1.6 mils.

b. Interior bathroom walls. Equal to: Sherwin Williams Paint Shield Microbicidal Interior Latex Paint Eggshell.

B. Interior Semigloss Acrylic Enamel: for Exterior Doors, frames and Metal surfaces. Including basement stair stringers.
1. Sherwin-Williams; ProMar 200 Interior Latex Semi-Gloss Enamel B31W2200 Series: Applied at a dry film thickness of not less than 1.3 mils.

C. Zinc-Coated Metal: Provide the following finish systems over interior zinc-coated metal surfaces: (exterior door)
1. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.
a. Primer: Metal primer.
b. Finish Coats: Semigloss acrylic enamel.

D. Masonry paint: Paint all exposed foundation walls. Paint (Behr) #SC-125 Stonehedge Satin Interior/Exterior Masonry, Stucco and Brick Paint. Color to match siding.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
1. Cement and Gypsum Boards: 12 percent.

C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

D. Proceed with coating application only after unsatisfactory conditions have been corrected.
1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.

B. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
1. Remove incompatible primers and re-prime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

C. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
   1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."
   1. Use applicators and techniques suited for paint and substrate indicated.
   2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
   3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
   4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
   5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 CLEANING AND PROTECTION

A. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
      a. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

END OF SECTION 099100

SECTION 101420

HOUSE NUMBERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. House numbers

1.3 REFERENCES

A. City of Rochester, NY Residential Planning and Zoning requirements for house numbers.

1.4 SUBMITTALS

A. Submit under provisions of Section 013000

B. Product Data: Manufacturer's data sheets

1.5 DELIVERY, STORAGE, AND HANDLING

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

PART 2 PRODUCTS

2.1 MANUFACTURERS

. A. Equal to: Baldwin:
1. Estate Door Accessories Collection. Model: 90671102
2. 4" numbers.
3. Color: Oil rubbed bronze.

PART 3 EXECUTION

3.1 EXAMINATION

A Examine for damage.

3.2 PREPARATION

A. Examine, clean, and repair as necessary any substrate conditions which would be detrimental to proper installation.

3.3 INSTALLATION

A. Install products in accordance with the latest printed instructions of the manufacturer.
B. Install where RHA representative directs.

3.4 PROTECTION

A. Protect installed products until completion of project.
B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 107461

RESIDENTIAL MAILBOX

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Residential wall mounted non-locking mailbox. 1 per apartment.

1.2 RELATED SECTIONS

A. Section 061000 - Rough Carpentry

B Section 074640 – Fiber Cement Siding

1.3 REFERENCES

A. US Postal Code

1.4 SUBMITTALS

A. Submit under provisions of Section 013000
B. Product Data: Manufacturer's data sheets

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation. Refer to manufacturer's installation instructions for specific storage and handling requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Whitehall Mailboxes. Whitehall Colonial Wall Mount Mailbox. Model WH-16600

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

A. Examine, clean, and repair as necessary any substrate conditions which would be detrimental to proper installation.

B. Do not begin installation until unacceptable conditions have been corrected.

3.3 INSTALLATION

A. Install products in accordance with the latest printed instructions of the manufacturer.

3.4 PROTECTION

A. Protect installed products until completion of project.
B. Touch-up, repair or replace damaged products before Substantial Completion.

3.5 CLEANING

A. At completion of work, remove debris caused by siding installation from project site.

END OF SECTION

SECTION 112491

WINDOW BLIND SHADES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Horizontal cordless louver blinds with aluminum slats.

2. Install in all room windows.

B. Related Sections include the following:

1. Division 6 Section "Miscellaneous Carpentry" for wood blocking and grounds for mounting horizontal louver blinds and accessories.
2. Division 16 Sections for electrical service and connections for motor operators, controls, limit switches, and other powered devices and for system disconnect switches for motorized blind operation.

1.3 SUBMITTALS

A. Window Treatment Schedule: For horizontal louver blinds. Use same designations indicated on Drawings.

1. Submit product spec sheet indicating sizes, colors, and mounting configuration.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain horizontal louver blinds through one source from a single manufacturer.

B. Fire-Test-Response Characteristics: Provide horizontal louver blinds with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

1. Flame-Resistance Ratings: Passes NFPA 701.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver horizontal louver blinds in factory packages, marked with manufacturer and product name, fire-test-response characteristics and location of installation using same designations indicated on Drawings and in a window treatment schedule.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install horizontal louver blinds until construction and wet and dirty finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Where horizontal louver blinds are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operable glazed units' operation hardware throughout the entire operating range. Notify Architect of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Horizontal Louver Blinds: Before installation begins, for each size, color, texture, pattern, and gloss indicated, full-size units equal to 5 percent of amount installed.

PART 2 - PRODUCTS

2.1 HORIZONTAL LOUVER BLINDS, ALUMINUM SLATS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

B. Products: Subject to compliance with requirements, provide one of the following:
1. Levolor, a Newell Rubbermaid Company;
   a. LEVOLOR Custom Cordless Room Darkening Cellular Window Blind Shade, Essence Collection (Sand).

2. Approved equal

3. Basis-of-Design Product: Subject to compliance with requirements, provide or a comparable product by one of the following:

C. Headrail: Formed steel or extruded aluminum; long edges returned or rolled; fully enclosing operating mechanisms on three sides and end plugs and the following:

1. Capacity: One blind per headrail
2. Integrated Headrail/Valance: Curved face
3. Light-blocking lower back lip.
4. Tilt limiter with preselected degree settings.

D. Bottom Rail: Formed-steel or extruded-aluminum tube, with plastic or metal capped ends [top contoured to match crowned shape of slat, bottom contoured for minimizing light gaps with enclosed ladders and tapes to prevent contact with sill.

E. Maximum Light-Blocking Blinds: Designed for eliminating all visible light gaps if slats are tilted closed; with tight tape spacing indicated and slats with minimal-sized rout holes for ladders hidden and placed near back edge for maximum slat overlap; with headrail and bottom rail extended and formed for light-tight joints between rail and adjacent slats or construction.

F. Lift Cords: Manufacturer's standard.

G. Valance: Manufacturer's standard.

1. Finish Color Characteristics: [Match color, texture, pattern, and gloss of slats

H. Mounting: Window head, permitting easy removal and replacement without damaging blind or adjacent surfaces and finishes; with spacers and shims required for blind placement and alignment indicated.

1. Provide intermediate support brackets if end support spacing exceeds spacing recommended by manufacturer for weight and size of blind.

I. Hold-Down Brackets and Hooks or Pins: Manufacturer's standard.

J. Side Channels and Perimeter Light Gap Seals: Manufacturer's standard.

K. Colors, Textures, Patterns, and Gloss: Match Architect's samples

2.2 BLIND FABRICATION

A. Concealed Components: Non-corrodible or corrosion-resistant-coated materials.

1. Lift-and-Tilt Mechanisms: With permanently lubricated moving parts.

B. Unit Sizes: Obtain units fabricated in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):

1. Blind Units Installed between (inside) Jambs: Width equal to 1/4 inch per side or 1/2 inch total, plus or minus 1/8 inch less than jamb-to-jamb dimension of opening in which each blind is installed. Length equal to 1/4 inch plus or minus 1/8 inch less than head-to-sill dimension of opening in which each blind is installed.

C. Installation Brackets: Designed for easy removal and reinstallation of blind, for supporting headrail, valance, and operating hardware, and for hardware position and blind mounting method indicated.

D. Installation Fasteners: No fewer than two fasteners per bracket, fabricated from metal noncorrosive to blind hardware and adjoining construction; type designed for securing to supporting substrate; and supporting blinds and accessories under conditions of normal use.

E. Color-Coated Finish:
1. Metal: For components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.
2. Component Color: Provide rails, cords, ladders, and exposed-to-view metal[, wood,] and plastic matching or coordinating with slat color, unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, [accurate locations of connections to building electrical system,]and other conditions affecting performance.

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

3.2 INSTALLATION

A. Install horizontal louver blinds level and plumb and aligned with adjacent units according to manufacturer's written instructions, and located so exterior slat edges in any position are not closer than 1 inch to interior face of glass. Install intermediate support as required to prevent deflection in headrail. Allow clearances between adjacent blinds and for operating glazed opening's operation hardware if any.

B. Head Mounted: Install headrail on face of opening head.

C. Connections: Connect motorized operators to building electrical system.

3.3 ADJUSTING

A. Adjust horizontal louver blinds to operate smoothly, easily, safely, and free of binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

A. Clean horizontal louver blind surfaces after installation, according to manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that horizontal louver blinds are without damage or deterioration at time of Substantial Completion.

C. Replace damaged horizontal louver blinds that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

END OF SECTION

SECTION 223301

DOMESTIC WATER HEATER

PART 1 GENERAL

1.0 NEW WATER TANK

A. Replace existing water tank with new tank specified herein.

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Valves: Section 220523.

B. Piping: Section 221100.

1.02 SUBMITTALS

A. Product Data: Catalog sheets, specifications and installation instructions for each water heater, gas vent pipe, fittings, and accessories required for the vent system.

B. Contract Closeout Submittals:
   1. Operation and Maintenance Data: Deliver 2 copies, covering the installed products, to the Director's Representative.
   2. Warranty: Copy of specified warranty.

1.03 REGULATORY REQUIREMENTS

A. Water heater shall bear the seal of the American Gas Association.

B. Comply with the State Energy Conservation Construction Code.

1.04 WARRANTY

A. Manufacturer's Warranty: Three year warranty for the glass lined water heater tank.

PART 2 PRODUCTS

2.01 WATER HEATER

A. Hot water tank equal to:
   1. AO Smith. Model GPVL-40. Power vented tank.

B. Tank: Welded steel, factory tested at 300 psi and rated for 150 psi working pressure.
   1. Glass lining permanently bonded to tank interior surface.
   2. Tank nipples factory installed.

3. Renewable magnesium anode.
4. Corrosion resistant dip tube.
5. Drain and relief valve tapping.
6. Renewable bronze boiler drain.
7. Flue heat baffle.
8. Draft hood.

B. Burner: Aluminized steel or cast iron, adjustable, or self-adjusting air-gas mixture control.

C. Thermostat: Automatic, adjustable, with automatic pilot, overheat control, and pilot operated automatic gas shut off.

D. Outer Casing: Steel, with baked enamel or acrylic finish.
1. Access door for servicing controls and burner.

E. Pressure-Temperature Relief Valve: AGA Z21.22; bronze body with stainless steel internals and threaded blow-off connection.

2.02 GAS VENT SYSTEM

A. UL listed Type B vent.

B. Construction: Double wall, comprised of galvanized steel outer casing and an aluminum alloy inner pipe separated by an air space; Metalbestos Type RV.

C. Accessories: Connectors, increasers, flashing, storm collar, thimble and vent top shall be products of the vent pipe manufacturer.

2.03 GAS VENT PIPE

A. 18 gage galvanized sheet steel with longitudinal groove type seam and slip fit joints with 4 inch engagement between sections.

2.04 MORTAR CEMENT

A. High Temperature: Combustion Engineering, Super #3000; Harbison-Walker, Harwaco Bond; National Refractories (Kaiser), Trowleze.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install the Work of this section in accordance with NFPA 54, NFPA 211, and the manufacturer's printed installation instructions, unless otherwise specified.

SECTION 223301

DOMESTIC WATER HEATER

B. Water Heater: Install heater on a level, firm base.
   1. Install the pressure - temperature relief valve in the dedicated tank tapping. Pipe relief valve blow-off to a point 6 inches above floor.
   2. Provide gate valves on hot and cold water connections and an AGA lubricated plug valve on the gas connection.
   3. Make final gas, and water piping connections with unions.

C. Gas Vent Piping:
   1. Secure each joint with 3 sheet metal screws.
   2. Support horizontal piping on 5 foot centers, maximum spacing, support vertical piping at every floor or 10 foot intervals maximum.
   3. Terminate vent extension through roof with a bird proof vent top.

D. Gas Vent Piping:
   1. Do not install vent piping within 12 inches of combustible materials.
   2. Secure each joint with 3 sheet metal screws.
   3. Support horizontal piping on 5 foot centers, maximum spacing.
   4. Cut flue opening into the masonry chimney. Install a standard weight steel pipe thimble into flue opening. Cement thimble into place with high temperature mortar.
   5. Seal vent pipe connection to thimble with high temperature mortar cement.
   6. Flush and fill tank; do not light burner until tank is full, and entrapped air is eliminated.

END OF SECTION

SECTION 233114

METAL DUCTWORK

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Ductwork and accessories for connections to furnace only.

1.02 REFERENCES

A. SMACNA: Sheet Metal and Air Conditioning Contractors National Association.

1.03 SUBMITTALS

A. Shop Drawings: Show duct material, gage, type of joints and duct reinforcing for each size range. Include sketches or SMACNA figure numbers for joints, method of fabrication, and reinforcing.

B. Product Data: Manufacturer's catalog sheets and installation instructions for motorized damper.

1.04 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Flexible fabric connections shall meet the requirements of NFPA Standards 90A and 90B.
   2. Electrical components shall be UL listed.
   3. SMACNA Manual: Gages of materials, fabrication, reinforcing, sealing, installation, and methods of supporting ductwork shall be in accordance with the HVAC Duct Construction Standards Manual, unless otherwise shown or specified.

PART 2 PRODUCTS

2.01 MATERIALS

A. Galvanized Steel Sheet: ASTM A 653, Class LFQ (lock forming quality), coating designation G90.
   1. For insulated duct and duct designed for two inches wg and over: Fabricate hollow metal doors in accordance with the SMACNA Manual.
   2. Fill void in doors for insulated duct with thermally equivalent insulation.

B. Duct Hangers:
   1. Band Hangers: Same material as duct.
   2. Rod Type Hangers: Mild low carbon steel, unless otherwise specified; fully threaded or threaded each end, with two removable nuts each end

for positioning and locking rod in place. Unless galvanized or cadmium plated, shop coat with red lead or zinc chromate primer paint.

C. Miscellaneous Fasteners and Upper Hanger Attachments:
   1. Sheet Metal Screws: Same material as duct.
   2. Machine Bolts and Nuts: Galvanized or cadmium plated steel.
   3. C Clamps: Fee & Mason 255L with locking nut, and 255S retaining strap.
   4. Welding Studs: Erico Fastening System, capacitor discharge, low carbon steel, copper flashed.
   5. Structural Steel Shapes and Plates: ASTM A 36, shop primed.
   6. Machine Bolt Expansion Anchors:
      a. Non-calking single unit type: FS FF-S-325, Group II, Type 2, Class 2, Style 1.
      b. Non-calking double unit type: FS FF-S-325, Group II, Type 2, Class 2, Style 2.
      c. Self-drilling type: FS FF-S-325, Group III, Types 1 and 2.

2.02 FLEXIBLE CONNECTIONS - FABRIC

A. Glass fabric coated with an inorganic elastomeric material, similar to Duro Dyne's Thermafab.

B. Factory prefabricated preassembled flexible fabric connectors of fabric specified in A. above, with minimum No. 24 USS gage metal edges similar to Duro Dyne's Metal-Fab.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

A. Fabricate all ductwork from galvanized steel sheet for connections to new furnace only. All other ductwork shall remain in place as in.

3.02 HANGERS FOR DUCTS

A. Install hangers for ducts as specified in the SMACNA Manual, with the following exception:
   1. For rectangular ducts up to 42 inches wide, supported from overhead construction, extend band hangers down over each side of duct and turn under bottom of duct a minimum of 2 inches. Secure hanger to duct with 3 sheet metal screws, one in bottom and 2 in side of duct.

3.03 UPPER HANGER ATTACHMENTS

A. Secure upper hanger attachments to structural steel or steel bar joists wherever possible.

B. Do not use drive-on beam clamps, powder driven drive pins or expansion nails.

C. Do not attach powder driven or welded studs to structural steel less than 3/16 inch thick.

3.04 FLEXIBLE FABRIC CONNECTORS

A. Secure fabric connectors to equipment and ducts as follows:
   1. Secure rectangular connectors with 1 inch x 1/8 inch thick flat galvanized steel bars, with screws or bolts on maximum 8 inch centers, or with approved sheet metal joints. Tightly crimp fabric into sheet metal joint and secure complete joint with sheet metal screws on maximum 6 inch centers.

C. Fabric connectors may be factory prefabricated preassembled units, with minimum No. 24 USS gage metal edges, secured to fabric with double lock seams.

D. Do not paint fabric connectors.

END OF SECTION

SECTION 235513

GAS FURNACE

PART 1 GENERAL

1.0 NEW GAS FURNACE

A. Remove and replace existing gas furnace and replace with new furnace specified herein.

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Metal Ductwork: Section 233144

B. Common Electric Work . Section 260509

C. Low Voltage Electrical 260519

1.02 SUBMITTALS

A. Product Data: Catalog sheets, performance charts, specifications and installation instructions for each type of furnace.

B. Contract Closeout Submittals
   1. Operation and Maintenance Data; Deliver 2 copies, covering the installed products, to the Director's Representative.

1.03 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Furnace shall be UL listed and labeled.
   2. Install in accordance with NFPA 54 National Fuel Gas Code.

1.04 MAINTENANCE

A. Extra Materials: Furnish two spare sets of furnace air filters. Spare filters shall be suitably boxed and labeled as to their usage.

PART 2 PRODUCTS

2.01 FURNACES, GENERAL

A. Fuel: Design furnace - burner units for firing with natural gas, rated at 60,000 Btuh.

B. Furnace unit shall be equal to:
   1. RHEEM R92TA0601317MSA 92+ high efficiency Furnace – Direct Vent.

C. Furnace - Burner - Control Unit: Furnace shall be a complete factory assembled and packaged unit of the type, consisting of a heat exchanger, fuel burning equipment,

blower section, filter section, operating controls, safety controls and wiring. The unit shall be complete with a factory fabricated, reinforced, insulated, sheet steel jacket, with a corrosion resistant baked enamel finish. Access doors, or easily removable panels, shall be provided for servicing of all internal components and changing of filters.

D. Blower Unit: Quiet operating, heavy duty centrifugal type installed on a single heavy duty shaft, mounted on self-aligning ball or lifetime lubricated bearings, Vee belt driven by an electric motor. Isolate motor from steel frame with resilient mountings.

E. Filter Section: 1 inch thick throw-away type filters installed in a built-in filter rack. Provide sufficient area so that the air velocity through filters does not exceed 300 fpm.

2.03 GAS FIRED FURNACES

A. Heat Exchanger: All welded construction, multiple flue gas pass type, fabricated of heavy gage black sheet steel.

B. Gas Burners: Atmospheric type, slotted or drilled cast iron burners, or stainless steel ribbon type.

C. Gas Burner Controls: Combination main gas control valve and pressure regulator and safety pilot. Draft diverter shall be of the built-in type or furnished for installing on top of unit.

D. Operating Controls: Factory wired and mounted on unit. Controls shall include fan and limit control with built-in summer switch, and an automatic thermostatic temperature regulator.

E. Install shut off toggle switch on the furnace unit.

2.04 AIR CONDITIONING CONDENSER UNIT

A. Provide and install A/C condenser equal to:

1. Carrier. Infinity 26 Air Conditioner with Greenspeed Intelligence. Model # 24VNA6.
2. 4 ton capacity. 17 SEER rating.
3. Provide line sets to unit per manufacturer.
4. Install electrical disconnect at unit, per NYSRC.
5. Mount on manufacturer's standard PVC base. (Do not use concrete).
6. Set on level ground. Put 6" pea gravel under base.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install furnace of type and capacity as noted on the drawings. Provide sufficient room for cleaning and servicing all components.

B. Install thermostat at location indicated on drawings.

C. Install electrical convenience switch on furnace unit.

3.02 FUEL FOR START-UP AND TESTING

A. Gas: Connect to existing installed gas piping or install gas service piping for firing furnaces, all as required by the drawings and the specifications.

B. Testing: Upon completion of the installation, and in the presence of the RHA's Representative, conduct a performance test on the furnace, for the purpose of checking general operation, proving electrical and mechanical controls and making necessary adjustments.

3.03 HOUSE THERMOSTAT

A. Provide: 24 hr. programmable type thermostat:

B. Unit equal to: White-Rodgers 1F80-361 5+1+1 Day Programmable Thermostat, 1H/1C.

END OF SECTION

SECTION 260500

COMMON WORK RESULTS FOR ELECTRICAL

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. Electrical equipment coordination and installation.
2. Sleeves for raceways and cables.
3. Sleeve seals.
4. Grout.
5. Common electrical installation requirements.

1.3 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

B. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

A. Product Data: For sleeve seals.

1.5 COORDINATION

A. Coordinate arrangement, mounting, and support of electrical equipment, including but not limited to: panelboards, starters, disconnects, raceways, conduits, etc.

1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
3. To allow right of way for piping and conduit installed at required slope.
4. So connecting raceways, cables, and wireways will be clear of obstructions and of the working and access space of other equipment.

B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08 Section "Access Doors and Frames."

D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."."

PART 2 - PRODUCTS

2.1 SLEEVES FOR RACEWAYS AND CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel.

1. Minimum Metal Thickness:

a. For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052 inch.
b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138 inch.

2.2 SLEEVE SEALS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

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

a. Advance Products & Systems, Inc.
b. Calpico, Inc.
c. Metraflex Co.
d. Pipeline Seal and Insulator, Inc.

2. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
3. Pressure Plates: Stainless steel. Include two for each sealing element.
4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.3 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

A. Comply with NECA 1.

B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

E. Right of Way: Give to piping systems installed at a required slope.

3.2 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Electrical penetrations occur when raceways, cables, or wireways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

E. Cut sleeves to length for mounting flush with both surfaces of walls.

F. Extend sleeves installed in floors 2 inches above finished floor level.

G. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable, unless indicated otherwise.

H. Seal space outside of sleeves with grout for penetrations of concrete and masonry

1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants.".

J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping."

K. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.

L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

3.3 SLEEVE-SEAL INSTALLATION

A. Install to seal exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.4 FIRESTOPPING

A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly.

END OF SECTION 260500

SECTION 260519

LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.

1.3 SUBMITTALS

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

B. Qualification Data: For testing agency.

C. Field quality-control test reports.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

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

1. American Insulated Wire Corp.; a Leviton Company.
2. General Cable Corporation.

3. Senator Wire & Cable Company.
4. Southwire Company.

B. Copper Conductors: Comply with NEMA WC 70.

C. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN and XHHW.

D. Multiconductor Cable: Comply with NEMA WC 70 for metal-clad cable.

2.2 CONNECTORS AND SPLICES

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

1. AFC Cable Systems, Inc.
2. Hubbell Power Systems, Inc.
3. O-Z/Gedney; EGS Electrical Group LLC.
4. 3M; Electrical Products Division.
5. Tyco Electronics Corp.

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper; Stranded.

B. Branch Circuits: Copper; Stranded.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. The use of nonmetallic-sheathed cable, Type NM, and Type USE with ground wire cables are not acceptable.

B. The use of metal clad cables is not acceptable for branch circuit home runs to panelboards and dedicated branch circuits.

C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type THHN-THWN, single conductors in raceway or Metal-clad cable, Type MC.

D. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway or Metal-clad cable, Type HFC MC^{AP}.

E. Class 1 Control Circuits: Type THHN-THWN, in raceway.

F. Class 2 Control Circuits: Power-limited cable, concealed in building finishes.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.

B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

E. Support cables according to Division 26 Section "Hangers and Supports for Electrical Systems."

F. Identify and color-code conductors and cables according to Division 26 Section "Identification for Electrical Systems."

3.4 CONNECTIONS

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

B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.5 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Perform tests and inspections and prepare test reports.

C. Tests and Inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

D. Test Reports: Prepare a written report to record the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

E. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 260519

SECTION 260526

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes methods and materials for grounding systems and equipment.

1.3 SUBMITTALS

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

B. Qualification Data: For testing agency and testing agency's field supervisor.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For grounding to include the following in emergency, operation, and maintenance manuals:

1. Instructions for periodic testing and inspection of grounding features at grounding connections for separately derived systems ased on NETA MTS and NFPA 70B.

a. Tests shall be to determine if ground resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if they do not.
b. Include recommended testing intervals.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association to supervise on-site testing specified in Part 3.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with UL 467 for grounding and bonding materials and equipment.

SECTION 260526

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 2 - PRODUCTS

2.1 CONDUCTORS

A. Insulated Conductors: Copper or tinned-copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction as specified in Section 260519 Low-Voltage Electrical Power Conductors and Cables.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.
4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
6. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

2.2 CONNECTORS

A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.

1. Pipe Connectors: Clamp type, sized for pipe.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger, unless otherwise indicated.

B. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

C. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.

3.2 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:

1. Feeders and branch circuits.
2. Lighting circuits.
3. Receptacle circuits.
4. Flexible raceway runs.
5. Armored and metal-clad cable runs.

C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

3.3 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.

C. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports:

B. Perform the following tests and inspections and prepare test reports:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.

C. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity 500 kVA and Less: 10 ohms.

D. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Owner and Engineer promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 260529

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Hangers and supports for electrical equipment and systems.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. IMC: Intermediate metal conduit.

C. RMC: Rigid metal conduit.

1.4 PERFORMANCE REQUIREMENTS

A. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

C. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.5 QUALITY ASSURANCE

A. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

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

    a. Allied Tube & Conduit.
    b. Cooper B-Line, Inc.; a division of Cooper Industries.
    c. ERICO International Corporation.
    d. GS Metals Corp.
    e. Thomas & Betts Corporation.
    f. Unistrut; Tyco International, Ltd.
    g. Wesanco, Inc.

2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
3. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
4. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
5. Channel Dimensions: Selected for applicable load criteria.

B. Nonmetallic Slotted Support Systems: Structural-grade, factory-formed, glass-fiber-resin channels and angles with 9/16-inch-diameter holes at a maximum of 8 inches o.c., in at least 1 surface.
    1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

        a. Allied Tube & Conduit.
        b. Cooper B-Line, Inc.; a division of Cooper Industries.
        c. Fabco Plastics Wholesale Limited.
        d. Seasafe, Inc.

    2. Fittings and Accessories: Products of channel and angle manufacturer and designed for use with those items.
    3. Fitting and Accessory Materials: Same as channels and angles, except metal items may be stainless steel.
    4. Rated Strength: Selected to suit applicable load criteria.

C. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

D. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

E. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

F. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

G. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

      1) Hilti Inc.
      2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
      3) MKT Fastening, LLC.
      4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.

2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

      1) Cooper B-Line, Inc.; a division of Cooper Industries.
      2) Empire Tool and Manufacturing Co., Inc.
      3) Hilti Inc.
      4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
      5) MKT Fastening, LLC.

3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as scheduled in NECA 1, where its Table 1 lists maximum spacings less than stated in NFPA 70. Minimum rod size shall be 1/4 inch in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

   1. Secure raceways and cables to these supports with two-bolt conduit clamps.

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb .

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
3. To Existing Concrete: Expansion anchor fasteners.
4. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
5. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
6. To Light Steel: Sheet metal screws.
7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Comply with installation requirements in Division 05 Section "Metal Fabrications" for site-fabricated metal supports.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.

B. Touchup: Comply with requirements in Division 09 painting Sections for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

SECTION 260533

RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. ENT: Electrical nonmetallic tubing.

C. EPDM: Ethylene-propylene-diene terpolymer rubber.

D. FMC: Flexible metal conduit.

E. IMC: Intermediate metal conduit.

F. LFMC: Liquidtight flexible metal conduit.

G. LFNC: Liquidtight flexible nonmetallic conduit.

H. NBR: Acrylonitrile-butadiene rubber.

I. RNC: Rigid nonmetallic conduit.

1.4 SUBMITTALS

A. Product Data: For surface raceways, wireways and fittings, hinged-cover enclosures, and cabinets.

B. Shop Drawings: For the following raceway components. Include plans, elevations, sections, details, and attachments to other work.

1. Custom enclosures and cabinets.

C. Qualification Data: For testing agency.

D. Source quality-control test reports.

SECTION 260533

RACEWAYS AND BOXES

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

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

1. AFC Cable Systems, Inc.
2. Alflex Inc.
3. Allied Tube & Conduit; a Tyco International Ltd. Co.
4. Anamet Electrical, Inc.; Anaconda Metal Hose.
5. Electri-Flex Co.
6. Manhattan/CDT/Cole-Flex.
7. Maverick Tube Corporation.
8. O-Z Gedney; a unit of General Signal.
9. Wheatland Tube Company.

B. Rigid Steel Conduit: ANSI C80.1.

C. IMC: ANSI C80.6.

D. EMT: ANSI C80.3, Factory-color-coated exterior per raceway identifications specified elsewhere (Allied Tube & Conduit "True Color" or equivalent).

E. FMC: Zinc-coated steel.

F. LFMC: Flexible steel conduit with PVC jacket.

G. RNC: Schedule 40 or 80 PVC.

H. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

1. Fittings for EMT: Steel set-screw or compression type.

I. Joint Compound for Rigid Steel Conduit or IMC: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

2.2 METAL WIREWAYS

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

1. Cooper B-Line, Inc.
2. Hoffman.
3. Square D; Schneider Electric.

B. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 1, unless otherwise indicated.

C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

D. Wireway Covers: Screw-cover type.

E. Finish: Manufacturer's standard enamel finish.

2.3 SURFACE RACEWAYS

A. Surface Metal Raceways: Galvanized steel with snap-on covers. Prime coating, ready for field painting.

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

a. Thomas & Betts Corporation.
b. Walker Systems, Inc.; Wiremold Company (The).
c. Wiremold Company (The); Electrical Sales Division.

2.4 BOXES, ENCLOSURES, AND CABINETS

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

1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
2. EGS/Appleton Electric.
3. Erickson Electrical Equipment Company.
4. Hoffman.
5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
6. O-Z/Gedney; a unit of General Signal.
7. RACO; a Hubbell Company.
8. Robroy Industries, Inc.; Enclosure Division.
9. Spring City Electrical Manufacturing Company.
10. Thomas & Betts Corporation.
11. Walker Systems, Inc.; Wiremold Company (The).

B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, aluminum, Type FD, with gasketed cover.

D. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

E. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, cast aluminum with gasketed cover.

F. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

G. Cabinets:

1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Comply with the following indoor applications, unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: Surface Metal Raceway in finished spaces and EMT in unfinished spaces.
2. Exposed and Subject to Severe Physical Damage: IMC.
3. Concealed in Ceilings and Interior Walls and Partitions: EMT.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
5. Damp or Wet Locations: IMC.
6. Exterior, Ungerground: RNC
7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, nonmetallic in damp or wet locations.

B. Minimum Raceway Size: 1/2-inch trade size.

C. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

3.2 INSTALLATION

A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.

B. Install raceways for branch circuit homeruns from panelboards to the first wiring device, for all dedicated branch circuits and for all lighting branch circuits, except maximum length of 6-foot metal clad cable may be used for final connection to lighting fixtures.

C. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

D. Complete raceway installation before starting conductor installation.

E. Support raceways as specified in Division 26 Section "Hangers and Supports for Electrical Systems."

F. Arrange stub-ups so curved portions of bends are not visible above the finished slab.

G. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.

H. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.

I. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

J. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.

K. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches of slack at each end of pull wire.

L. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations.
2. Where conduits pass into anesthetizing areas.
3. Where otherwise required by NFPA 70.

M. Flexible Conduit Connections: Use maximum of 72 inches of flexible conduit for recessed and semirecessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

1. Use LFMC in damp or wet locations subject to severe physical damage.
2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.

N. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.

O. Exterior, Underground Conduit: Provide all trenching, backfilling and surface restoration as required. Surface restoration shall match existing and surrounding conditions.

3.3 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly.

3.4 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

SECTION 260553

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Identification for raceway and metal-clad cable.
2. Identification for conductors and communication and control cable.
3. Equipment identification labels.
4. Miscellaneous identification products.

1.3 SUBMITTALS

A. Shop Drawings: For the following components; submit an itemized list of each component and proposed labeling, including label and text colors for approval prior to labeling any components.

1. Each panelboard
2. Each disconnect switch
3. Each enclosed circuit breaker.

1.4 QUALITY ASSURANCE

A. Comply with ANSI A13.1 and ANSI C2.

B. Comply with NFPA 70.

C. Comply with 29 CFR 1910.145.

1.5 COORDINATION

A. Coordinate identification names, abbreviations, colors, and other features with requirements in the Contract Documents, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual, and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.

B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

C. Coordinate installation of identifying devices with location of access panels and doors.

D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 RACEWAY AND METAL-CLAD CABLE IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

C. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeves, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

D. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeves, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

E. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; 2 inches wide; compounded for outdoor use.

2.2 CONDUCTOR AND COMMUNICATION- AND CONTROL-CABLE IDENTIFICATION MATERIALS

A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.

B. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

C. Write-On Tags: Polyester tag, 0.015 inch thick, with corrosion-resistant grommet and polyester or nylon tie for attachment to conductor or cable.

1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

2.3 EQUIPMENT IDENTIFICATION LABELS

A. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed. Minimum letter height shall be 35pt font.

B. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. Minimum letter height shall be 35pt font.

C. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch.

2.4 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Cable Ties: Fungus-inert, self-extinguishing, 1-piece, self-locking, Type 6/6 nylon cable ties.

1. Minimum Width: 3/16 inch.
2. Tensile Strength: 50 lb, minimum.
3. Temperature Range: Minus 40 to plus 185 deg F .
4. Color: Black, except where used for color-coding.

B. Paint: Paint materials and application requirements are specified in Division 09 painting Sections.

C. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 APPLICATION

A. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 50 A: Factory-colored EMT conduit and MC Type Cables; Identify all with orange self-adhesive vinyl label or snap-around label.

B. Accessible Raceways and Cables of Auxiliary Systems: Factory-colored EMT conduit and MC Type Cables; other raceways with color-coded, self-adhesive vinyl tape applied in bands or snap-around, color-coding bands. Identify the following systems:

1. Emergency Power System raceways and conduit: Green.
2. Fire Alarm System: Red.
3. Fire-Suppression Supervisory and Control System: Red and yellow.
4. Mechanical and Electrical Supervisory System: Green and blue.
5. Telecommunication System: Green and yellow.
6. Control Wiring: Green and red.

C. Power-Circuit Conductor Identification: For secondary conductors No. 2 AWG and larger in vaults, pull and junction boxes, and handholes use color-coding conductor tape and metal tags. Identify source and circuit number of each set of conductors. For single conductor cables, identify phase in addition to the above.

D. Branch-Circuit Conductor Identification: Where there are conductors for more than three branch circuits in same junction or pull box, use color-coding conductor tape and write-on tags. Identify each ungrounded conductor according to source and circuit number.

E. Conductors to Be Extended in the Future: Attach write-on tags to conductors and list source and circuit number.

F. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, signal, sound, intercommunications, voice, and data connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and Operation and Maintenance Manual.

G. Equipment Identification Labels: On each unit of equipment, install unique designation labels that are consistent with Labeling Standards, wiring diagrams, schedules, and Operation and Maintenance Manuals. Apply labels to all electrical equipment, protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:

a. Indoor Equipment: Self-adhesive, engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high label; where 2 lines of text are required, use labels 2 inches high.
b. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.

2. Equipment to Be Labeled:

a. Panelboards, electrical cabinets, and enclosures.
b. Transformers
c. Disconnect switches.
d. Enclosed circuit breakers.
e. Emergency system boxes and enclosures.
f. Push-button stations.
g. Contactors.
h. Fire-alarm control panel and annunciators.
i. Monitoring and control equipment.
j. Access doors and panels for concealed electrical items.
k. ACT ceiling tiles concealing electrical control equipment and devices.

3. Labeling Requirements:
a. Equipment shall be furnished with two (2) labels.
1) The top label shall indicate equipment location and equipment identification
2) The top label shall be black letters on white background
3) The top label shall be Self-Adhesive, Engraved, Laminated Acrylic or Melamine, minimum 1” height, and 80pt font.
4) The second (bottom) label shall indicate the power source [ie. Fed from]

5) The second label shall be black letters on white background for (240) 208/120 volt equipment and black letters on yellow background for 480/277 volt equipment.
6) The second label shall be Self-Adhesive, Engraved, Laminated Acrylic or Melamine or self-adhesive vinyl tape, minimum 1" hieght, and 35pt font.

3.2 INSTALLATION

A. Verify identity of each item with Owner before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

C. Apply identification devices to surfaces that require finish after completing finish work.

D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

E. Attach nonadhesive signs and plastic labels with screws and auxiliary hardware appropriate to the location and substrate.

F. System Identification Color Banding for Raceways and Cables: Each color band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 8-foot maximum intervals in straight runs, and at 8-foot maximum intervals in congested areas.

G. Color-Coding for Phase Identification, 600 V and Less: Use the colors listed below for service, feeder, and branch-circuit conductors.

1. Color shall be factory applied or, for sizes larger than No. 8 AWG if authorities having jurisdiction permit, field applied.

2. Colors for (240) 208/120-V Circuits:

a. Phase A: Black.
b. Phase B: Red.
c. Phase C: Blue.
d. Neutral: White.
e. Ground: Green

3. Colors for 480/277-V Circuits:

a. Phase A: Brown.
b. Phase B: Orange.
c. Phase C: Yellow.
d. Neutral: Gray.
e. Ground: Green

4. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made.

Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

H. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.

I. Painted Identification: Prepare surface and apply paint according to Division 09 painting Sections.

END OF SECTION 260553

SECTION 262416

PANELBOARDS

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. Lighting and appliance branch-circuit panelboards.

1.3 SUBMITTALS

A. Product Data: For each type of panelboard, switching and overcurrent protective device, transient voltage suppression device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each panelboard and related equipment.

   1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
   2. Detail enclosure types and details for types other than NEMA 250, Type 1.
   3. Detail bus configuration, current, and voltage ratings.
   4. Short-circuit current rating of panelboards and overcurrent protective devices.
   5. Include evidence of NRTL listing for series rating of installed devices.
   6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
   7. Include wiring diagrams for power, signal, and control wiring.
   8. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards. Submit on translucent log-log graft paper; include selectable ranges for each type of overcurrent protective device.

C. Qualification Data: For qualified testing agency.

D. Field Quality-Control Reports:

   1. Test procedures used.
   2. Test results that comply with requirements.
   3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

E. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.

F. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
2. Time-current curves, including selectable ranges for each type of overcurrent protective device that allows adjustments.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: Member company of NETA or an NRTL.

1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

B. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.

C. 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.

D. Comply with NEMA PB 1.

E. Comply with NFPA 70.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Remove loose packing and flammable materials from inside panelboards; install temporary electric heating (250 W per panelboard) to prevent condensation.

B. Handle and prepare panelboards for installation according to NEMA PB 1.

1.6 PROJECT CONDITIONS

A. Environmental Limitations:

1. Do not deliver or install panelboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above panelboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

B. Service Conditions: NEMA PB 1, usual service conditions, as follows:

1. Ambient temperatures within limits specified.
2. Altitude not exceeding 6600 feet (2000 m).

SECTION 262416

PANELBOARDS

1.7 COORDINATION

A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PANELBOARDS

A. Fabricate and test panelboards according to IEEE 344 to withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."

B. Enclosures: Flush- and surface-mounted cabinets as indicated.

1. Rated for environmental conditions at installed location.

a. Indoor Dry and Clean Locations: NEMA 250, Type 1.
b. Outdoor Locations: NEMA 250, Type 3R.

2. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
3. Finishes:

a. Panels and Trim: Steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
b. Back Boxes: Same finish as panels and trim.

4. Directory Card: Inside panelboard door, mounted in metal frame with transparent protective cover.

C. Incoming Mains Location: Top or bottom.

D. Phase, Neutral, and Ground Buses:

1. Material: Tin-plated aluminum.
2. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
3. Sub-Feed and Feed-Thru Lugs as indicated.

E. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Material: Tin-plated aluminum.
2. Main and Neutral Lugs: Mechanical type.
3. Ground Lugs and Bus-Configured Terminators: Mechanical type.
4. Feed-Through Lugs: Mechanical type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
5. Subfeed (Double) Lugs: Mechanical type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.

F. Service Equipment Label: NRTL labeled for use as service equipment for panelboards with one or more main service disconnecting and overcurrent protective devices.

G. Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.

H. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals.

2.2 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

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

1. Square D; a brand of Schneider Electric.
2. Eaton/Cutler-Hammer.
3. Or equivalent.

B. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.

C. Mains: Circuit breaker or lugs only as indicated.

D. Branch Overcurrent Protective Devices: Plug-in circuit breakers, replaceable without disturbing adjacent units.

E. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.

2.3 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

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

1. Square D; a brand of Schneider Electric.
2. Eaton/Cutler-Hammer.
3. Or equivalent.

B. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with interrupting capacity to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
3. Electronic trip circuit breakers with rms sensing; field-replaceable rating plug or field-replicable electronic trip; and the following field-adjustable settings:

    a. Instantaneous trip.
    b. Long- and short-time pickup levels.
    c. Long- and short-time time adjustments.
    d. Ground-fault pickup level, time delay, and I^2t response.

4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
5. GFCI Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).
6. Ground-Fault Equipment Protection (GFEP) Circuit Breakers: Class B ground-fault protection (30-mA trip).
7. Molded-Case Circuit-Breaker (MCCB) Features and Accessories:

    a. Standard frame sizes, trip ratings, and number of poles.
    b. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
    c. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.
    d. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
    e. Multipole units enclosed in a single housing or factory assembled to operate as a single unit.
    f. Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in on or off position.
    g. Handle Clamp: Loose attachment, for holding circuit-breaker handle in on position.

2.4 ACCESSORY COMPONENTS AND FEATURES

A. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Receive, inspect, handle, and store panelboards according to NEMA PB 1.1.

B. Examine panelboards before installation. Reject panelboards that are damaged or rusted or have been subjected to water saturation.

C. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.

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

3.2 INSTALLATION

A. Install panelboards and accessories according to NEMA PB 1.1.

B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panelboards.

C. Mount top of trim 90 inches above finished floor unless otherwise indicated.

D. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.

E. Install overcurrent protective devices and controllers not already factory installed.

1. Set field-adjustable, circuit-breaker trip ranges.

F. Install filler plates in unused spaces.

G. Stub four 1-inch (27-GRC) empty conduits from recessed panelboards into accessible ceiling space or space designated to be ceiling space in the future.

H. Arrange conductors in gutters into groups and bundle and wrap with wire ties.

I. Comply with NECA 1.

3.3 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Division 26 Section "Identification for Electrical Systems."

B. Create a directory to indicate installed circuit loads after balancing panelboard loads; incorporate Owner's final room designations. Obtain approval before installing. Provide a type-written (printed) directory; handwritten directories are not acceptable.

C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

D. Device Nameplates: Label each branch circuit device in distribution panelboards with a nameplate complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

C. 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.

D. Acceptance Testing Preparation:

1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

E. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
3. Perform the following infrared scan tests and inspections and prepare reports:

a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each panelboard. Remove front panels so joints and connections are accessible to portable scanner.
b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each panelboard 11 months after date of Substantial Completion.
c. Instruments and Equipment:

1) Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

F. Panelboards will be considered defective if they do not pass tests and inspections.

G. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

A. Adjust moving parts and operable component to function smoothly, and lubricate as recommended by manufacturer.

B. Set field-adjustable circuit-breaker trip ranges as indicated.

C. Load Balancing: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes.

1. Measure as directed during period of normal system loading.
2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24-hour services.
3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.
4. Tolerance: Difference exceeding 20 percent between phase loads, within a panelboard, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.

3.6 PROTECTION

A. Temporary Heating: Apply temporary heat to maintain temperature according to manufacturer's written instructions.

END OF SECTION 262416

SECTION 262713

ELECTRICITY METERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes equipment for utility company's electricity metering.

1.3 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes. Describe electrical characteristics, features, and operating sequences, both automatic and manual. Include the following:

1. Electricity-metering equipment.

B. Shop Drawings for Electricity-Metering Equipment:

1. Dimensioned plans and sections or elevation layouts.
2. Wiring Diagrams: Power, signal, and control wiring specific to this Project. Identify terminals and wiring designations and color codes to facilitate installation, operation, and maintenance. Indicate recommended types, wire sizes, and circuiting arrangements for field-installed wiring, and show circuit protection features.
3. Mounting and anchoring devices recommended by manufacturer to resist seismic forces specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."

C. Field quality-control test reports.

D. Operation and Maintenance Data: For electricity-metering equipment to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

SECTION 262713

ELECTRICITY METERING

1.5 DELIVERY, STORAGE, AND HANDLING

A. Receive, store, and handle modular meter center as specified in NECA 400.

1.6 PROJECT CONDITIONS

A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:

1. Notify Owner and Tenant no fewer than [two] 2 days in advance of proposed interruption of electrical service.
2. Do not proceed with interruption of electrical service without Owner's written permission.

1.7 COORDINATION

A. Electrical Service Connections: Coordinate with utility companies and components they furnish as follows:

1. Comply with requirements of utilities providing electrical power and communication services.
2. Coordinate installation and connection of utilities and services, including provision for electricity-metering components.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

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

2.2 EQUIPMENT FOR ELECTRICITY METERING BY UTILITY COMPANY

A. Current-Transformer Cabinets: Comply with requirements of electrical power utility company.

B. Meter Sockets: Comply with requirements of electrical power utility company.

C. Modular Meter Center: Factory-coordinated assembly of a main service terminal box with disconnect device, wireways, tenant meter socket modules, and tenant feeder circuit breakers

arranged in adjacent vertical sections. Assembly shall be complete with interconnecting buses and other features as specified below.

1. Manufacturers:
   a. Cutler-Hammer; Eaton Corporation.
   b. General Electric Company; Electrical Distribution & Control Div.
   c. Square D; Schneider Electric.

2. Housing: NEMA 250, Type 3R enclosure.

   a. Structural strength of the housing, its anchorage and component attachment provisions, and anchorage devices recommended for anchoring the housing in place shall be adequate to prevent separation of equipment and its components from their installed positions.

3. Minimum Short-Circuit Rating: As indicated in One-Line Diagram or Schedule.
4. Main Disconnect Device: As indicated in One-Line Diagram or Schedule.
5. Tenant Feeder Circuit Breakers: Series-combination-rated molded case units, rated to protect circuit breakers in downstream tenant and house loadcenters and panelboards that have 10,000-A interrupting capacity.

   a. Identification: Complying with Division 26 Section "Identification for Electrical Systems" with legend identifying tenant's address.
   b. Physical Protection: Tamper resistant, with hasp for padlock.

6. Meter Socket: Type as approved by utility company, with rating coordinated with indicated tenant feeder circuit rating.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with equipment installation requirements in NECA 1.

B. Install equipment for utility company metering. Install raceways and equipment according to utility company's written requirements. Provide empty conduits for metering leads and extend grounding connections as required by utility company.

C. Install modular meter center according to NECA 400 switchboard installation requirements.

3.2 FIELD QUALITY CONTROL

A. Inspect electricity-metering installation for proper installation and operation.
   1. Repair or replace damaged, deficient or malfunctioning metering equipment.

SECTION 262713

ELECTRICITY METERING

END OF SECTION 262713

SECTION 265600

EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Exterior luminaires with lamps and ballasts.
2. Luminaire-mounted photoelectric relays.
3. Poles and accessories.

1.3 STRUCTURAL ANALYSIS CRITERIA FOR POLE SELECTION

A. Dead Load: Weight of luminaire and its horizontal and vertical supports, and supporting structure, applied as stated in AASHTO LTS-4.

B. Live Load: Single load of 500 lbf, distributed as stated in AASHTO LTS-4.

C. Ice Load: Load of 3 lbf/sq. ft., applied as stated in AASHTO LTS-4.

D. Wind Load: Pressure of wind on pole and luminaire, calculated and applied as stated in AASHTO LTS-4.

1. Wind speed for calculating wind load for poles 50 feet or less in height is 110 mph.

1.4 SUBMITTALS

A. Product Data: For each luminaire, pole, and support component, arranged in order of lighting unit designation. Include data on features, accessories, finishes, and the following:

1. Physical description of luminaire, including materials, dimensions, effective projected area, and verification of indicated parameters.
2. Details of attaching luminaires and accessories.
3. Details of installation and construction.
4. Luminaire materials.
5. Photometric data based on laboratory tests of each luminaire type, complete with indicated lamps, ballasts, and accessories.

a. Photometric data shall be certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.

6. Photoelectric relays.
7. Ballasts, including energy-efficiency data.
8. Lamps, including life, output, and energy-efficiency data.
9. Materials, dimensions, and finishes of poles.
10. Means of attaching luminaires to supports, and indication that attachment is suitable for components involved.
11. Anchor bolts for poles.
12. Manufactured pole foundations.

B. Pole and Support Component Certificates: Signed by manufacturers of poles, certifying that products are designed for indicated load requirements in AASHTO LTS-4 and that load imposed by luminaire has been included in design.

C. Operation and Maintenance Data: For luminaires and poles to include in operation, and maintenance manuals.

D. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by manufacturers' laboratories that are accredited under the National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with IEEE C2, "National Electrical Safety Code."

D. Comply with NFPA 70.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Package aluminum poles for shipping according to ASTM B 660.

B. Store poles on decay-resistant-treated skids at least 12 inches above grade and vegetation. Support poles to prevent distortion and arrange to provide free air circulation.

C. Retain factory-applied pole wrappings on metal poles until right before pole installation. For poles with nonmetallic finishes, handle with web fabric straps.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace products that fail in materials or workmanship; that corrode; or that fade, stain, perforate, erode, or chalk due to effects of weather or solar radiation within specified warranty period. Manufacturer may exclude lightning damage, hail damage, vandalism, abuse, or unauthorized repairs or alterations from special warranty coverage.

1. Warranty Period for Luminaires: Five years from date of Substantial Completion.
2. Warranty Period for Metal Corrosion: Five years from date of Substantial Completion.
3. Warranty Period for Color Retention: Five years from date of Substantial Completion.
4. Warranty Period for Lamps: Replace lamps and fuses that fail within 12 months from date of Substantial Completion; furnish replacement lamps and fuses that fail within the second 12 months from date of Substantial Completion.
5. Warranty Period for Poles: Repair or replace lighting poles and standards that fail in finish, materials, and workmanship within manufacturer's standard warranty period, but not less than three years from date of Substantial Completion.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Glass and Plastic Lenses, Covers, and Other Optical Parts: 10 for every 100 of each type and rating installed. Furnish at least one of each type.
2. Globes and Guards: 1 for every 20 of each type and rating installed. Furnish at least one of each type.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In Exterior Lighting Device Schedule where titles below are column or row headings that introduce lists, the following requirements apply to product selection:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
2. Basis of Design Product: The design of each item of exterior luminaire and its support is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

2.2 LUMINAIRES, GENERAL REQUIREMENTS

A. Luminaires shall comply with UL 1598 and be listed and labeled for installation in wet locations by an NRTL acceptable to authorities having jurisdiction.

B. Comply with IESNA RP-8 for parameters of lateral light distribution patterns indicated for luminaires.

C. Metal Parts: Free of burrs and sharp corners and edges.

D. Sheet Metal Components: Corrosion-resistant aluminum, unless otherwise indicated. Form and support to prevent warping and sagging.

E. Housings: Rigidly formed, weather- and light-tight enclosures that will not warp, sag, or deform in use. Provide filter/breather for enclosed luminaires.

F. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position. Doors shall be removable for cleaning or replacing lenses. Designed to disconnect ballast when door opens.

G. Exposed Hardware Material: Stainless steel.

H. Plastic Parts: High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

I. Light Shields: Metal baffles, factory installed and field adjustable, arranged to block light distribution to indicated portion of normally illuminated area or field.

J. Reflecting surfaces shall have minimum reflectance as follows, unless otherwise indicated:

1. White Surfaces: 85 percent.
2. Specular Surfaces: 83 percent.
3. Diffusing Specular Surfaces: 75 percent.

K. Lenses and Refractors Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.

L. Luminaire Finish: Manufacturer's standard paint applied to factory-assembled and -tested luminaire before shipping. Where indicated, match finish process and color of pole or support materials.

M. Factory-Applied Finish for Steel Luminaires: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, and other contaminants that could impair paint bond. Grind welds and polish surfaces to a smooth, even finish. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP 8, "Pickling."

2. Exterior Surfaces: Manufacturer's standard finish consisting of one or more coats of primer and two finish coats of high-gloss, high-build polyurethane enamel.

   a. Color: As selected from manufacturer's standard catalog of colors.

N. Factory-Applied Finish for Aluminum Luminaires: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
2. Natural Satin Finish: Provide fine, directional, medium satin polish (AA-M32); buff complying with AA-M20; and seal aluminum surfaces with clear, hard-coat wax.
3. Class I, Clear Anodic Finish: AA-M32C22A41 (Mechanical Finish: medium satin; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.
4. Class I, Color Anodic Finish: AA-M32C22A42/A44 (Mechanical Finish: medium satin; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 611.

   a. Color: Dark bronze or Black.

2.3 LUMINAIRE-MOUNTED PHOTOELECTRIC RELAYS

A. Comply with UL 773 or UL 773A.

B. Contact Relays: Factory mounted, single throw, designed to fail in the on position, and factory set to turn light unit on at 1.5 to 3 fc and off at 4.5 to 10 fc with 15-second minimum time delay. Relay shall have directional lens in front of photocell to prevent artificial light sources from causing false turnoff.

1. Relay with locking-type receptacle shall comply with NEMA C136.10.
2. Adjustable window slide for adjusting on-off set points.

2.4 POLES AND SUPPORT COMPONENTS, GENERAL REQUIREMENTS

A. Structural Characteristics: Comply with AASHTO LTS-4.

1. Wind-Load Strength of Poles: Adequate at indicated heights above grade without failure, permanent deflection, or whipping in steady winds of speed indicated in Part 1 "Structural Analysis Criteria for Pole Selection" Article, with a gust factor of 1.3.
2. Strength Analysis: For each pole, multiply the actual equivalent projected area of luminaires and brackets by a factor of 1.1 to obtain the equivalent projected area to be used in pole selection strength analysis.

B. Luminaire Attachment Provisions: Comply with luminaire manufacturers' mounting requirements. Use stainless-steel fasteners and mounting bolts, unless otherwise indicated.

C. Mountings, Fasteners, and Appurtenances: Corrosion-resistant items compatible with support components.

1. Materials: Shall not cause galvanic action at contact points.
2. Anchor Bolts, Leveling Nuts, Bolt Caps, and Washers: Hot-dip galvanized after fabrication, unless stainless-steel items are indicated.
3. Anchor-Bolt Template: Plywood or steel.

D. Concrete Pole Foundations: Pre-Cast, with anchor bolts to match pole-base flange.

2.5 STEEL POLES

A. Poles: Comply with ASTM A 500, Grade B, carbon steel with a minimum yield of 46,000 psig 1-piece construction up to 40 feet in height with access handhole in pole wall.

1. Shape: As Scheduled
2. Mounting Provisions: Butt flange for bolted mounting on foundation or breakaway support.

B. Pole-Top Tenons: Fabricated to support luminaire or luminaires and brackets indicated, and securely fastened to pole top.

C. Grounding and Bonding Lugs: Welded 1/2-inch (13-mm) threaded lug, accessible through handhole.

D. Cable Support Grip: Wire-mesh type with rotating attachment eye, sized for diameter of cable and rated for a minimum load equal to weight of supported cable times a 5.0 safety factor.

E. Factory-Painted Finish: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, and other contaminants that could impair paint bond. Grind welds and polish surfaces to a smooth, even finish. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP 8, "Pickling."
2. Interior Surfaces of Pole: One coat of bituminous paint, or otherwise treat for equal corrosion protection.
3. Exterior Surfaces: Manufacturer's standard finish consisting of one or more coats of primer and two finish coats of high-gloss, high-build polyurethane enamel.

    a. Color: As Scheduled

2.6 ALUMINUM POLES

A. Poles: ASTM B 209 (ASTM B 209M), 5052-H34 marine sheet alloy with access handhole in pole wall.

1. Shape: As Scheduled.
2. Mounting Provisions: Butt flange for bolted mounting on foundation or breakaway support.

B. Pole-Top Tenons: Fabricated to support luminaire or luminaires and brackets indicated, and securely fastened to pole top.

C. Grounding and Bonding Lugs: Welded 1/2-inch threaded lug, accessible through handhole.

D. Brackets for Luminaires: Detachable, with pole and adapter fittings of cast aluminum. Adapter fitting welded to pole and bracket, then bolted together with stainless-steel bolts.

1. Tapered oval cross section, with straight tubular end section to accommodate luminaire.
2. Finish: Same as pole and luminaire.

E. Prime-Coat Finish: Manufacturer's standard prime-coat finish ready for field painting.

F. Aluminum Finish: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
2. Natural Satin Finish: Provide fine, directional, medium satin polish (AA-M32); buff complying with AA-M20; and seal aluminum surfaces with clear, hard-coat wax.
3. Class I, Color Anodic Finish: AA-M32C22A42/A44 (Mechanical Finish: medium satin; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 611.

a. Color: As Scheduled..

2.7 POLE ACCESSORIES

A. Duplex Receptacle (where scheduled): 120 V, 20 A in a weatherproof assembly, ground-fault circuit-interrupter type.

1. Recessed, 24 inches above finished grade.
2. Nonmetallic polycarbonate plastic or reinforced fiberglass cover, color to match pole, that when mounted results in NEMA 250, Type 3R enclosure.
3. With cord opening.
4. With lockable hasp and latch that complies with OSHA lockout and tag-out requirements.

B. Base Covers: Manufacturers' standard metal units, arranged to cover pole's mounting bolts and nuts. Finish same as pole.

PART 3 - EXECUTION

3.1 LUMINAIRE INSTALLATION

A. Fasten luminaire to indicated structural supports.

1. Use fastening methods and materials selected to resist seismic forces defined for the application and approved by manufacturer.

B. Adjust luminaires that require field adjustment or aiming. Include adjustment of photoelectric device to prevent false operation of relay by artificial light sources.

3.2 POLE INSTALLATION

A. Align pole foundations and poles for optimum directional alignment of luminaires and their mounting provisions on the pole.

B. Clearances: Maintain the following minimum horizontal distances of poles from surface and underground features, unless otherwise indicated on Drawings:

1. Fire Hydrants and Storm Drainage Piping: 60 inches.
2. Water, Gas, Electric, Communication, and Sewer Lines: 10 feet.
3. Trees: 15 feet.

C. Concrete Pole Foundations: Set in pole locations indicated per clearances specified above.

D. Foundation-Mounted Poles: Mount pole with leveling nuts, and tighten top nuts to torque level recommended by pole manufacturer.

1. Use anchor bolts and nuts selected to resist seismic forces defined for the application and approved by manufacturer.
2. Grout void between pole base and foundation. Use nonshrink or expanding concrete grout firmly packed to fill space.
3. Install base covers, unless otherwise indicated.

E. Raise and set poles using web fabric slings (not chain or cable).

3.3 CORROSION PREVENTION

A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum by insulating fittings or treatment.

3.4 GROUNDING

A. Ground metal poles and support structures.

1. Install grounding electrode for each pole, unless otherwise indicated.
2. Install grounding conductor pigtail in the base for connecting luminaire to grounding system.

B. Ground nonmetallic poles and support structures.

1. Install grounding electrode for each pole.
2. Install grounding conductor and conductor protector.
3. Ground metallic components of pole accessories and foundations.

3.5 FIELD QUALITY CONTROL

A. Inspect each installed fixture for damage. Replace damaged fixtures and components.

B. Illumination Observations: Verify normal operation of lighting units after installing luminaires and energizing circuits with normal power source.

1. Verify operation of photoelectric controls.

END OF SECTION 265600

EXTERIOR LIGHT POLES

SECTION 265600

PART 1 GENERAL
1.1 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Materials and installation requirements for concrete bases for poles. Note: Cast in place bases shall be priced in CONSTRUCTION portion of this project.
B. Section 26 05 29 - Hangers and Supports for Electrical Systems.
C. Section 26 05 33.16 - Boxes for Electrical Systems.
D. Section 31 23 23 - Fill: Backfilling of Light Pole Bases.

1.2 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
B. NECA/IESNA 501 - Standard for Installing Exterior Lighting Systems; 2006.
C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
D. UL 1598 - Luminaires; Current Edition, Including All Revisions.

1.3 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, weight, effective projected area (EPA), and installed accessories; include model number nomenclature clearly marked with all proposed features.
C. Operation and Maintenance Data: Instructions for each product including information on replacement parts.
D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Lamps: Ten percent of total quantity installed for each type, but not less than two of each type.

1.4 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Receive, handle, and store products according to NECA/IESNA 501 and manufacturer's written instructions.
B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

PART 2 PRODUCTS
2.1 LUMINAIRE TYPES

A. Furnish products as indicated in luminaire schedule included on the drawings. See Electrical Specifications for make and model. See Electrical Specifications. Exterior Luminaires shall be priced in the ELECTRICAL BID section of your bids.

2.2 LUMINAIRES

A. Provide products that comply with requirements of NFPA 70.
B. Provide products that are listed and labeled as complying with UL 1598, where applicable.
C. Provide products listed, classified, and labeled as suitable for the purpose intended.
D. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.
E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, poles, foundations, supports, trims, accessories, etc. as necessary for acomplete operating system.
F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

2.3 POLES

A. All Poles: Shall be included in base bid for CONSTRUCTION.
   1. Provide poles and associated support components suitable for the luminaire(s) and associated supports and accessories to be installed.
   2. Material: Steel, unless otherwise indicated.
   3. Finish: Match luminaire finish, unless otherwise indicated.
   4. Mounting: Install on concrete foundation, height as indicated on the drawings, unless otherwise indicated.

PART 3 EXECUTION
3.1 EXAMINATION

A. Verify that field measurements are as indicated.
B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.
C. Verify that suitable support frames are installed where required.
D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.
E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.
B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.3 INSTALLATION

A. Coordinate locations of outlet boxes provided under Section 26 05 33.16 as required for installation of luminaires provided under this section.
B. Install products in accordance with manufacturer's instructions.
C. Install luminaires in accordance with NECA/IESNA 501.
D. Provide required support and attachment in accordance with Section 26 05 29.
E. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.
F. Pole-Mounted Luminaires:
   1. Foundation-Mounted Poles: shall be equal to Lakelands Precast concrete products, or approved equal. Model LPB-6. Size: 2' x 6'.
      a. Provide cast-in-place concrete foundations for poles as indicated, in accordance with Section 033000.
         1) Install anchor bolts plumb per template furnished by pole manufacturer.
         2) Position conduits to enter pole shaft.
      b. Coordinate installation of bases with all other affected trades.
      c. Excavation for Pole Bases shall be either open cut or auger drilling, and create a minimum of six inch annular space around the perimeter of the base..
      d. Compact base of excavation prior to adding manufacturer's recommended stone setting base.
      e. Install foundations plumb, and support during backfilling to maintain plumb.
      f. Backfill according to manufacturer's recommendations and in accordance with Section 31 23 23.
      g. Repair any exposed surfaces damaged by installation to match color and texture of surrounding surfaces.
      h. Install poles plumb, using leveling nuts or shims as required to adjust to plumb.
      i. Tighten anchor bolt nuts to manufacturer's recommended torque.
   2. Grounding:
      a. Bond luminaires, metal accessories, metal poles, and foundation reinforcement to branch circuit equipment grounding conductor.
   3. Install separate service conductors, 12 AWG copper, from each luminaire down to handhole for connection to branch circuit conductors.

G. Install accessories furnished with each luminaire.
H. Bond products and metal accessories to branch circuit equipment grounding conductor.
I. Install lamps in each luminaire.

3.4 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.
B. Inspect each product for damage and defects.
C. Operate each luminaire after installation and connection to verify proper operation.

D. Correct wiring deficiencies and repair or replace damaged or defective products. Repair orreplace excessively noisy ballasts as determined by Architect.

3.5 ADJUSTING

A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Architect. Secure locking fittings in place.

3.6 CLEANING

A. Clean surfaces according to NECA/IESNA 501 and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

3.7 CLOSEOUT ACTIVITIES

A. Demonstration: Demonstrate proper operation of luminaires to Architect, and correct deficiencies or make adjustments as directed.

3.8 PROTECTION

A. Protect installed luminaires from subsequent construction operations.

END OF SECTION

EXCAVATION

SECTION 312316

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Excavating for footings, pile caps, slabs-on-grade, paving, site structures, and landscaping.
B. Trenching for utilities outside the building to utility main connections.
C. Temporary excavation support and protection systems.
D. Soil densification

1.2 RELATED REQUIREMENTS

A. Section 01 57 13 - Temporary Erosion and Sediment Control: Slope protection and erosion control.
B. Section 31 23 16.13 - Trenching: Excavating for utility trenches outside the building to utility main connections.
C. Section 31 23 23 - Fill: Fill materials, backfilling, and compacting.

1.3 REFERENCE STANDARDS

A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Shop Drawings: Indicated soil densification grid for each size and configuration footing requiring soils densification.
C. Field Quality Control Submittals: Document visual inspection of load-bearing excavated surfaces.

1.5 QUALITY ASSURANCE

A. Fill Material Tests: A sieve analysis, loss on ignition, and magnesium sulfate soundness test shall be taken for each type of material from each source of material. Tests will be in accordance with appropriate ASTM methods. Tests shall be taken by an approved independent laboratory and results submitted directly to the Architect before such material is used for fill. Material which fails to meet the specified requirements shall be removed from the site. Payment for tests shall be as described in General Requirements. Rochester Housing Authority 1-3 Thomas St. Parking Lot Site Upgrade Project

PART 2 PRODUCTS

2.1 NOT USED

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that survey bench mark and intended elevations for the work are as indicated.

3.2 PREPARATION

A. Identify required lines, levels, contours, and datum locations.
B. See Section 31 10 00 for clearing, grubbing, and removal of existing debris.
C. See Section 31 22 00 for topsoil removal.
D. Protect utilities that remain and protect from damage.
E. Call Local Utility One Call Center @ 811in the State of New York, not less than three working days before performing Work.
   1. Request underground utilities to be located and marked within and surrounding construction areas.
F. Notify utility company to remove and relocate utilities.
G. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
H. Protect plants, lawns, and other features to remain.
I. Grade top perimeter of excavation to prevent surface water from draining into excavation. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by Architect.

3.3 GENERAL EXCAVATION

A. Excavate to accommodate building foundations, slab on grade, and paving, construction operations and site structures.
B. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
C. Preparation for Piling Work: Excavate to working elevations. Coordinate special requirements for pilings, and Light Pole foundations.
D. Do not interfere with 45 degree bearing splay of foundations.
E. Remove lumped subsoil, boulders, and rock up to 1/3 cubic yard measured by volume.
F. Provide temporary means and methods, as required, to remove all water from excavations until directed by Architect. Remove and replace soils deemed suitable by classification and which are excessively moist due to lack of dewatering or surface water control.
G. Compact disturbed load bearing soil in direct contact with foundations to original bearing capacity; perform compaction in accordance with Section 31 23 23 and Section 31 23 16.13.
H. Repair or replace any items indicated to remain damaged by excavation.

3.4 TOPSOIL EXCAVATION

A. Excavate topsoil from areas to be further excavated, re-landscaped, or regraded, marked

areas, entire site, without mixing with foreign materials for use in finish grading.

B. Do not excavate wet topsoil.

C. Stockpile in area designated on site to depth not exceeding 8 feet and protect from erosion. Stockpile material on impervious material 36 mil Hypalon material and cover over with same material, until disposal.

D. Do not remove topsoil from site.

3.5 SUBSOIL EXCAVATION

A. Do not excavate wet subsoil or excavate and process wet material to obtain optimum moisture content.

B. When excavating through roots, perform Work by hand and cut roots with sharp axe.

C. Remove excess subsoil not intended for reuse, from site.

D. Benching Slopes: Horizontally bench existing slopes greater than 1: 4 to key placed fill material to slope to provide firm bearing.

E. Stability: Replace damaged or displaced subsoil as specified for fill.

3.6 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection and testing.

B. Provide for visual inspection of load-bearing excavated surfaces by Architect before placement of foundations.

3.7 PROTECTION

A. Divert surface flow from rains or water discharges from the excavation.

B. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.

C. Protect open excavations from rainfall, runoff, freezing groundwater, or excessive drying so as to maintain foundation subgrade in satisfactory, undisturbed condition.

D. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

E. Keep excavations free of standing water and completely free of water during concrete placement.

F. Protect structures, utilities and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earth operations.

END OF SECTION

TRENCHING
PART 1 GENERAL
1.1 SECTION INCLUDES

A. Excavation trenches for utilities outside the buildings to utility main connections.
B. Compacted fill from top of utility bedding to subgrade elevations.
C. Backfilling and compaction.

1.2 RELATED REQUIREMENTS
A. Section 31 05 13 - Soils for Earthwork: Soils for fill.
B. Section 31 05 16 - Aggregates for Earthwork: Aggregates for fill
C. Section 31 22 00 - Grading: Site grading.
D. Section 31 23 16 - Excavation: Building and foundation excavating.
E. Section 31 23 23 - Fill: Backfilling at building and foundations.

1.3 DEFINITIONS

A. Finish Grade Elevations: Indicated on drawings.
B. Subgrade Elevations: Indicated on drawings.
C. Utility: Any buried pipe, duct, conduit, or cable.

1.4 REFERENCE STANDARDS

A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18 in.) Drop; 2018.
B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012, with Editorial Revision (2015).
C. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method; 2015, with Editorial Revision (2016).
D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012, with Editorial Revision (2015).
E. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2015.
F. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2017a.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Samples: 10 pound sample of each type of fill; submit in air-tight containers to testing laboratory.
C. Materials Sources: Submit name of imported materials source.

D. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
E. Compaction Density Test Reports.
F. Product Data: Submit data for geo-textile fabric indicating fabric and construction.
G. Manufacturer's Certificate: Certify Products meet or exceed specified requirements

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1.6 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.
B. When fill materials need to be stored on site, locate stockpiles where designated.
1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
2. Prevent contamination.
3. Protect stockpiles from erosion and deterioration of materials.

1.7 QUALITY ASSURANCE

A. Perform work in accordance with Department of Transportation Standards in the State of New York.

1.8 FIELD MEASUREMENTS
A. Verify field measurements prior to fabrication.

1.9 COORDINATION
A. See Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
B. Verify work associated with lower elevation utilities is complete before placing higher elevation
utilities.

PART 2 PRODUCTS
2.1 FILL MATERIALS
A. See Section 31 23 23 - Fill.
B. See Section 31 05 13 - Soils for Earthwork.
C. See Section 31 05 16 - Aggregates for Earthwork.

2.2 ACCESSORIES
A. Geotextile: Non-biodegradable, woven.

2.3 SOURCE QUALITY CONTROL
A. See Section 01 40 00 - Quality Requirements, for general requirements for testing and analysis of soil material.
B. Where fill materials are specified by reference to a specific standard, test and analyze samples

for compliance before delivery to site.

C. If tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that survey bench marks and intended elevations for the work are as indicated.

3.2 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. Grade top perimeter of trenching area to prevent surface water from draining into trench. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by the Architect.

3.3 TRENCHING

A. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

B. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.

C. Do not interfere with 45 degree bearing splay of foundations.

D. Cut trenches wide enough to allow inspection of installed utilities.

E. Hand trim excavations. Remove loose matter.

F. Remove large stones and other hard matter that could damage piping or impede consistent backfilling or compaction.

G. Remove lumped subsoil, boulders, and rock up to 1/3 cubic yard measured by volume.

H. Remove excavated material that is unsuitable for re-use from site.

I. Stockpile excavated material to be re-used in area designated in Section 31 22 00.

J. Remove excess excavated material from site.

K. Provide temporary means and methods, as required, to remove all water from trenching until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

L. Determine the prevailing groundwater level prior to trenching. If the proposed trench extends less than 1 foot into the prevailing groundwater, control groundwater intrusion with perimeter drains routed to sump pumps, or as directed by the Architect.

M. Do not advance open trench more than 100 feet ahead of installed pipe.

N. Excavate bottom of trenches maximum of 2 feet wider than outside diameter of pipe or as indicated on plans.

O. Excavate trenches to depth indicated on drawings. Provide uniform nd continuous bearing and support for bedding material and pipe utilities.

P. When Project conditions permit, slope side walls of excavation starting 2 feet above top of pipe. When side walls cannot be sloped, provide sheeting and shoring to protect excavation as specified in this section or as required by OSHA.

Q. When subsurface materials at bottom of trench are loose or soft, excavate to greater depth as directed by Architect/Engineer until suitable material is encountered. Notify Architect/Engineer,

and request instructions prior to excavation.

R. Cut out soft areas of sub-grade not capable of compaction in place. Backfill with approved fill material and compact to density equal to or greater than requirements for subsequent backfill material.

S. Correct over excavated areas with compacted backfill as specified for authorized excavation or replace with fill concrete as directed by Architect/Engineer.

3.4 PREPARATION FOR UTILITY PLACEMENT

A. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.

B. Compact subgrade to density equal to or greater than requirements for subsequent fill material.until ready to backfill, maintain excavations and prevent loose soil from falling into excavation.

3.5 BACKFILLING

A. Backfill to contours and elevations indicated using unfrozen materials.

B. Employ a placement method that does not disturb or damage other work.

C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

D. Maintain optimum moisture content of fill materials to attain required compaction density.

E. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

F. Correct areas that are over-excavated.

1. Other areas: Use general fill, flush to required elevation, compacted to minimum 97 percent of maximum dry density.

G. Compaction Density Unless Otherwise Specified or Indicated:

1. Under paving, slabs-on-grade, and similar construction: 97 percent of maximum dry density.

H. Reshape and re-compact fills subjected to vehicular traffic.

I. Place geotextile fabric over bedding fill prior to placing subsequent fill materials.

J. Place fill material in continuous layers and compact in accordance with schedule at end of thissection.

K. Employ placement method that does not disturb or damage foundation perimeter drainage,
utilities in trench, and other below grade improvements.

L. Do not leave open trenching at end of working day.

M. Protect open trenches at all times during installation of trenching.

3.6 BEDDING AND FILL AT SPECIFIC LOCATIONS

A. Use general fill unless otherwise specified or indicated.

3.7 TOLERANCES

A. See Section 01 40 00 - Quality Requirements: Tolerances.
B. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.
C. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch from required elevations.

3.8 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for general requirements for field inspection and testing.
B. Perform compaction density testing on compacted fill in accordance with ASTM D1556/D1556M, ASTM D2167, or ASTM D6938.
C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D1557 ("modified Proctor"), AASHTO T 180, or ASTM D698 ("standard Proctor").
D. If tests indicate work does not meet specified requirements, remove work, replace and retest.
E. Frequency of Tests: 1 for every 50 feet of trench.

3.9 CLEANING

A. Leave unused materials in a neat, compact stockpile.
B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

END OF SECTION

SECTION 32 31 13

DUMPSTER ENCLOSURE

PART 1 – GENERAL

1.1. DESCRIPTION

A. This section describes the following dumpster fence enclosure system:

1. Provide and install dumpster enclosure of solid composite panels fabricated with and structural aluminum profiles including extruded aluminum fence posts and aluminum panel gates.
2. Solid panel security screening and gates shall be furnished and installed as shown on the plans and specified herein, overall height of solid screening shall be 6'-0" tall.

2.2 WORK IN RELATED SECTIONS

A. Section 033000 – Cast in-place concrete. For concrete pad and raised "Bump Stop".

2.3 REQUIREMENTS

A. Furnish materials, labor, expertise and equipment necessary to complete all work specified in this section and as shown on the drawings.

B. Structural Performance: Provide product and installation capable of withstanding the effects of gravity lads and the following loads and stresses within limits and under conditions indicated.

1. Uniform pressure of 30 lbf/sq. ft. acting inward or outward.
2. Thermal Movements resulting from a temperature change (range) of 120 degrees Fahrenheit ambient and 180 degrees Fahrenheit material surfaces.

2.4 SUBMITTALS

A. Shop drawings and manufacturer's literature: Provide specifications and construction detail drawings to substantiate quality of materials and provide details of fabrication and installation.

B. Submittals shall be in accordance with standard construction practices to include complete detailed layout of all panels, posts, gates. Submittals shall include plan layout, elevations and section views of panels, posts and gates.

C. Certificate: manufacturer's certification that materials meet specification requirements.

SECTION 32 31 13

DUMPSTER ENCLOSURE

2.5 REFERENCES

A. ASTM B 209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

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

C. ASTM D3363 – Standard Test Method for Film Hardness by Pencil Test.

D. ASTM D2794 – Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation.

E. ASTM B117 – Standard Practice for Operating Salt Spray Apparatus.

F. ASTM D822 – Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.

G. AWS D1.2 Structural Welding Code – Aluminum.

H. ASTM D-7032-04: Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails)

I. ASTM International. B. ASTM D-7031-04: Standard Guide for Evaluating Mechanical and Physical Properties of Wood-Plastic Composite Products

J. ASTM International C. ASTM E-84-01: Test Method for Surface Burning Characteristics of Building Materials

K. ASTM D 570: Water Absorption of Plastics

L. ASTM D 1761: Mechanical Fasteners in Wood

M. ASTM D -1413-99: Test method for Wood Preservatives by Laboratory Soilblock Cultures

N. ASTM C177: Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus

2.6 QUALITY ASSURANCE

A. Installation of fence and materials shall conform to the requirements of the fence manufacturer.

B. The fence shall be warranted from any defects in materials and workmanship for a period as

specified in the relevant section of the contract documents.

PART 2 – PRODUCTS

2.1. MATERIALS

A. Solid panel security fence: Trex Transcend Series tongue and groove planks, or equal.

1. Approved Architectural Solid Screening System, Manufacturer:
   a. PalmSHIELD Manufacturing. https://palmshieldlouvers.com.

2. Material Descriptions:
   a. Extruded Aluminum: ASTM B 221, Alloy 6063 – Temper T-6.
   b. Sheet Aluminum: ASTM B211, Alloy 6063 – Temper T6.
   c. Powder Coating Material Hardness: ASTM 3363 2H.

3. Palm Shield EnDeck's Forest Series, embossed wood-grain 30 Year Fade and Stain warranty.

4. Panel Description:

   a. Panel Height: 6'-0"
   b. Panel Width: Not to exceed 60"
   c. Solid panel system consisting of horizontal tongue and groove modular panels fabricated with extruded aluminum framing structural profiles and supported by extruded aluminum fence posts.
   d. Panel Vertical Framework: 2 ½" x 2 ½" inch x 1/8" inch aluminum angle. Framework supporting the solid tongue and groove screening shall be solid welded and mitered.
   e. Panel Horizontal Top Cap: 2 ½" x 2 ½" inch x 1/8" inch aluminum angle
   f. Panel Horizontal Bottom Cap: 2 ½" x 2 ½" inch x 1/8" inch aluminum angle

2. Fence Posts:
   a. Panel posts shall be 3" square x 1/8" inch minimum extruded tubular aluminum sections with solid aluminum caps. Length as specified on the contract drawings.
   b. On center post spacing shall be as specified by manufacturer.
   c. All fence posts to be plated with 8" x 8" x5 /8" aluminum plates with four ¾" hole for anchors. Anchor directly into concrete pad.

3. Fittings and accessories: All fittings and accessories shall be stainless steel and sized as specified by the fence manufacturer. Fence panels to be attached to posts with ¼" x 1" stainless steel screws. Panels and posts are predrilled to support level installation.

4. Anchor Bolts: Anchor bolts shall be 6" long x 3/8" and adequate to support loads

based on screening height, exposures and loading. Set in high strength grout in concrete pad.

5. Gates: (Provided by Manufacturer). Swing to exterior of enclosure, size as shown on contract drawings.
   a. Panel spacing, style and appearance shall be identical to fence panels.
   b. Gate hinges to be Gorilla barrel hinge with ¾" rod, ball bearing, and grease zert. Hinge plate to be ½" thick plates offset to create a 5/8" gap. Standard hardware as required by the gate manufacturer for complete functional operation. Hinges to be bolted to gate frame and field welded to steel gate posts.
   c. Gate latch to be internal lock with exterior grab handles. Lock may be keyed and rekeyed. Lock is accessible from both sides of gate.
   d. Welded frame, size as shown on the contract drawings, extruded aluminum tubing with composite infill to match..
   e. Drop rods to be 1" schedule 40 pipe and through bolted to gate frame.
   f. Hardware: Size and type as determined by the manufacturer. Provide three hinges per leaf.
      1. Provide 1 inch diameter center cane bolt assembly and strike, each door.
      2. Provide padlockable slide bolt assembly.
   g. Gate shall have welded frame fabricated from extruded aluminum tubing with composite infill to match. Frame configurations shall be as indicated on the contract drawings.
   h. Gate posts shall be as determined by manufacture. Gate posts to be specified to support gates.

6. Factory Finish: Vinyl fence planks and aluminum posts and gates shall receive polyester powder coating.
   a. Polyester powder coating: Electrostatically applied colored polyester powder coating heat cured to chemically bond finish to metal substrate.
   b. Color shall be as selected by RHA.
   c. Minimum hardness measured in accordance with ASTM D3363 2H.
   d. Direct impact resistance tested in accordance with ASTM D2794. Withstand 160 inch-pounds.
   e. Salt spray resistance tested in accordance with ASTM B117: No undercutting, rusting, or blistering after 500 hours in 5 percent salt spray at 95° F and 95% relative humidity after 1,000 hours, less than 3/16 inches undercutting.
   f. Weatherability tested in accordance with ASTM D822.

SECTION 32 31 13

DUMPSTER ENCLOSURE

PART 3 – EXECUTION

3.1 INSPECTION

A. Verify that final grading in fence location is completed and without irregularities which will interfere with fence installation. Dumpster Enclosure to be installed on a level surface.
B. Field verify all fence dimensions and layout prior to commencing installation.
C. Do not commence work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install fence in accordance with manufacturer's installation instructions.
B. Install fence plumb and level. Posts are plated and mounted to top of surface.
C. Do not install bent, bowed or otherwise damaged panels. Remove damaged components from site and replace.
D. Secure fence panels with stainless with ¼" x 1" stainless steel screws to fence posts. All posts and panels will be predrilled to support level installation.
E. Gates
    a. Install gates and adjust hardware for smooth operation

END OF SECTION

SECTION 321236

PAVEMENT SEALING

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Pavement Striping: Section 321723

1.02 SUBMITTALS

A. Product Data: Manufacturer's catalog cuts, specifications, installation instructions for sealants.

1.03 PROJECT CONDITIONS

A. Environmental Conditions:
   1. Do not apply sealant when the air temperature is 50 degrees F or lower and falling, when the pavement is wet, or when rain is anticipated within eight hours.

B. Allow a minimum of 7 days to lapse, and follow manufacturer's written instructions, before applying sealant to new asphalt surfaces.

PART 2 PRODUCTS

2.01 MATERIALS

A. Sealant: FS R-P-355d, "Pitch, Coal Tar Emulsion (Coating for Bituminous Pavements)".

B. Mineral Aggregate: Clean, hard and durable graded silica, free from deleterious matter such as clay, dirt, organic matter or mineral salts and conforming to the following gradations:

SIEVE DESIGNATION	PERCENT PASSING
No. 16	100
No. 30	15 - 85
No. 50	2 - 10
No. 100	0 - 2

PART 3 EXECUTION

3.01 PREPARATION

A. Remove all dust, dirt, salt, paint, loose pavement markings, and other foreign matter.

B. Scrape, burn, or wash with detergent solution to remove accumulations of oil or grease. Flush away residue with clean water and allow to dry.

3.02 APPLICATION

A. Mix mineral aggregate with sealant to a smooth, uniform consistency at the following proportions.

MINERAL AGGREGATE PER GALLON	
First Application	3 - 6 pounds dry weight
Second Application	1 - 2 pounds dry weight

B. Apply sealant by squeegee, brush, or mechanical equipment in accordance with the manufacturer's printed instructions at the following rate:

UNDILUTED GALLONS PER SQUARE YARD	
First Application	.10 to .12
Second Application	.08 to .10

C. Allow sealant to cure 24 hours prior to opening to traffic.

END OF SECTION

PAVEMENT STRIPING

SECTION 321723

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Painted pavement markings.

1.2 RELATED REQUIREMENTS

A. Section 32 12 16 - Asphalt Paving.

1.3 REFERENCE STANDARDS

A. AASHTO MP 24 - Standard Specification for Waterborne White and Yellow Traffic Paints; 2015 (Reapproved 2020).

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate the work of this section with adjoining work.
B. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by affected installers.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
B. Shop Drawings: Indicate survey control points and pavement markings color and layout.
   1. Layout and color shall be Owner approved prior to application.
C. Shop Drawings: Indicate traffic management plan with barricades, cones, and temporary markings.
D. Product Data: Manufacturer's data sheets on each product to be used.
E. Certificates: Submit for each batch stating compliance with specified requirements.
   1. Painted pavement markings.
F. Manufacturer's Instructions:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements for additional provisions.
   2. Extra Paint: 2 containers, 1 gallon size, of each type and color.
   3. Extra Markers: 5 percent, of each type and color.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver paint in containers of at least 5 gallons accompanied by batch certificate.
B. Store products in manufacturer's unopened packaging until ready for installation.

1.7 FIELD CONDITIONS

A. Do not install products under environmental conditions outside manufacturer's absolute limits.
B. Do not apply paint if temperature of surface to be painted or the atmosphere is less than 50 degrees F or more than 95 degrees F.

1.8 SEQUENCING

A. Allow new pavement surfaces to cure for a period of not less than 30 days before application of markings.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Painted Pavement Markings:
1. Ennis-Flint: www.ennisflintamericas.com.
2. Franklin Paint; HYDROPHAST: www.franklinpaint.com.
3. Ozark Materials, LLC: www.ozarkmaterials.net .
4. Sherwin Williams: www.sherwin-williams.com.
5. Approved Equal: See Section 01 60 00 - Product Requirements.

B. Temporary Marking Tape:
1. 3M: Stamark: www.3m.com.

2.2 PAINTED PAVEMENT AND CURB MARKINGS

A. Painted Pavement Markings: As indicated on drawings.
1. Marking Paint: Latex Based, in accordance with AASHTO MP 24.
a. Parking Lots: White.
b. Symbols and Text: White.
c. Accessible Symbols: Provide blue.
d. Curb Text: Red.

2.3 TEMPORARY MARKING TAPE

A. Preformed, reflective, pressure sensitive adhesive tape in color(s) required; Contractor is responsible for selection of material of sufficient durability as to perform satisfactorily during period for which its use is required.

PART 3 EXECUTION

3.1 EXAMINATION

A. Owner verification: Verify by Owner approved shop drawings of new pavement markings prior to beginning application.
1. Final approval by Owner following chalking out, shall be required.

B. Verification of Conditions: Verify that pavement is dry and ready for installation.
C. Notify Architect of unsatisfactory conditions before proceeding.

3.2 PREPARATION

A. Establish survey control points for locating and dimensioning of markings.
B. Place barricades, warning signs, and flags as necessary to alert approaching traffic and prevent traffic crossing newly painted markings.
C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
D. Clean surfaces prior to installation.
   1. Remove dust, dirt, and other debris by sweeping, blowing with compressed air, rinsing with water, or a combination of these methods.
   2. Remove rubber deposits and other coatings adhering to the pavement, by scraping, wire brushing, sandblasting, mechanical abrasion, or approved chemicals.
   3. Remove existing paint markings by mechanical means outlined above or by applying obliterating paint.
   4. Sandblasting: Use equipment of size and capacity necessary, providing not less than 150 cfm of air at pressure not less than 90 psi at each nozzle used.
E. Where oil or grease are present, scrub affected areas with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinse thoroughly after each application; after cleaning, seal oil-soaked areas with cut shellac to prevent bleeding through the new paint.
F. Temporary Markings: Apply as directed by Architect.
G. Apply paint stencils by type and color at necessary intervals.

3.3 INSTALLATION

A. General:
   1. Position pavement markings as indicated on drawings and approved shop drawings.
   2. Field location adjustments require approval of Architect and Owner.
   3. Allow traffic movement without hindrance.
B. Painted Pavement Markings:
   1. Apply in accordance with manufacturer's instructions using an experienced technician that is thoroughly familiar with equipment, materials, and marking layouts.
   2. Marking Paint: Apply uniformly, with sharp edges.
      a. Applications: Two coats.
      b. Wet Film Thickness: 0.015 inch, minimum.
      c. Stencils: Lay flat against pavement, align with striping, remove after application.
      d. Length Tolerance: Plus or minus 3 inches.
      e. Width Tolerance: Plus or minus 1/8 inch.
   3. Roadway Traffic Lanes: Use suitable mobile mechanical equipment that provides constant agitation of paint and travels at controlled speeds.
      a. Conduct operations in such a manner that necessary traffic can move without hindrance.
      b. If paint does not dry within expected time, discontinue paint operations until cause of slow drying is determined and corrected.

c. Skip Markings: Synchronize one or more paint "guns" to automatically begin and cut off paint flow; make length of intervals as indicated.
d. Use hand application by pneumatic spray for application of paint in areas where a mobile paint applicator cannot be used.

C. Temporary Pavement Markings: When required or directed by Architect, or where phasing plans and schedules indicate, apply temporary markings of the color(s), width(s) and length(s) as indicated or directed.
1. After temporary marking has served its purpose, remove temporary marking by carefully controlled sandblasting, approved grinding equipment, or other approved method so that surface to which the marking was applied will not be damaged.
2. At Contractor's option, temporary marking tape may be used in lieu of temporary painted marking; remove unsatisfactory tape and replace with painted markings at no additional cost to Owner.

3.4 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements for additional requirements.
B. If inspections indicate work does not meet specified requirements, rework and reinspect at no cost to Owner.
1. Remove and replace markings that are applied at less than minimum material rates; deviate from true alignment; exceed length and width tolerances; or show light spots, smears, or other deficiencies or irregularities.
2. Remove unsatisfactory markings in a manner to avoid damage to the surface to which the marking was applied by carefully controlled sandblasting, approved grinding equipment,or other approved method.
C. Allow the pavement marking to set at least the minimum time recommended by manufacturer.

3.5 CLOSEOUT ACTIVITIES

A. See Section 017700 - Closeout Submittals for additional requirements.
B. Temporary Markings: Remove without damaging surfaces.

3.6 PROTECTION

A. Prevent approaching traffic from crossing newly applied pavement markings.
B. Replace damaged or removed markings at no additional cost to Owner.
C. Preserve survey control points until pavement marking acceptance.

END OF SECTION

SECTION 329301

LANDSCAPING

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Aluminum Yard Fence: Section 057800

1.02 REFERENCES

A. Plant Nomenclature: Conform to the latest edition of "Standardized Plant Names" as adopted by the American Joint Committee of Horticultural Nomenclature.

B. Size and Grading Standards: Conform to the current edition of "American Standard for Nursery Stock" - Sponsor - the American Association of Nurserymen Inc., unless otherwise specified.

1.03 SUBMITTALS

A. List of Plants: Before plant material is shipped to the project site, submit a complete itemized list of all plants including the source of supply.

B. Product Data: Furnish the following with each planting material delivery.
   1. Invoice indicating sizes and variety of plant material.
   2. Certificates of inspection required by State and Federal agencies.
   3. Labels for each plant or bundles of plants indicating name and size.

C. Quality Control Submittals:
   1. Worker's Qualifications Data: Names and addresses of 5 similar projects that each person has worked on during the past 2 years.

1.04 QUALITY ASSURANCE

A. Worker's Qualifications: The persons performing the planting and their supervisor shall be personally experienced in the planting and caring of plant material and shall have been regularly employed by a company engaged in the planting and caring of plant material for a minimum of 2 years.

B. Caliper trees up to 4 inches in caliber at a point 6 inches above ground and trees over 4 inches in caliber 12 inches above ground.

C. Do not use woody plant material from regions south of latitude 39 degrees unless such material has been lined out in nurseries located north of latitude 39 degrees for at least 2 growing seasons. Latitude 39 degrees is approximately a line from Annapolis, MD to Cincinnati, OH.

SECTION 329301

LANDSCAPING

1.05 DELIVERY, STORAGE AND HANDLING

A. Notify the RHA Director's Representative 48 hours in advance of delivery of plant material.

B. Protect plants against climatic and mechanical injuries.

C. Deliver fertilizer in manufacturer's standard sized bags showing weight, analysis, and manufacturer's name. Store under a waterproof cover or in a dry place as designated by the Director's Representative.

1.06 PROJECT CONDITIONS

A. Water will be furnished by the State from existing facilities as directed. Furnish hoses and connections required to adequately water plants.

1.07 SCHEDULING

A. Plant deciduous, woody plants between October 1 and May 15 whenever temperature is above 32 degrees F and soil is in workable condition, unless otherwise approved in writing.

B. Plant evergreens between August 15 and September 15 or during April or May before start of new growth.

1.08 PLANTING GUARANTEE

A. The guarantee shall extend for a period of one year from the date of physical completion. Physical completion for the Work of this Section is the date or dates when all the planting operations, or seasonal portions of the planting operations, or replacement planting operations have been completed and are accepted by the Director's Representative.

PART 2 PRODUCTS

2.01 PLANTS

A. Shrubs and Trees:
   1. Nursery grown stock unless otherwise indicated in the itemized plant list.
   2. Acclimated plants true to genus and species.
   3. Well developed root and branch systems. Do not prune branches before delivery.
   4. Free of disease, insect eggs, bark abrasions, and disfiguring knots.
   5. Buds intact and reasonably closed at time of planting.
   6. Balled and burlapped from soil which will hold a natural ball. Manufactured balls are unacceptable.

7. Conform to size indicated or larger, or within the minimum maximum size when so indicated. Larger plants cut back to specified dimensions will not be accepted.

B. Trees:
1. Single erect leader from ground to top, surrounded with uniformly arranged branches.
2. Free from frost cracks, broken bark, and dead or broken branches.
3. Transplanted, or root pruned 360 degrees at least once during the previous 3 years.

2.02 PLANTING SOIL

A. Topsoil for Planting Soil: Obtain from outside sources.

B. Soil Amendments (For every 4 cu yd of topsoil):
1. Peat Moss: 7-1/2 cu ft bale or 15 bushels (loose measure).
2. Fertilizer: 5 lb.
3. Bonemeal: 80 lb.

C. In the presence of the Director's Representative, place the soil amendments over the topsoil piles and turn over the combined elements a minimum of 3 times until thoroughly mixed.

2.03 FERTILIZER

A. Bonemeal: Commercial, steamed finely ground material containing not less than 1.0 percent nitrogen and 11 percent phosphoric acid.

B. Commercial Fertilizer (10-6-4): Containing not less than 10 percent nitrogen, 6 percent available phosphoric acid and 4 percent water soluble potash.

2.04 MULCH

A. Peat Moss: Finely granulated material, passing a 1/2 inch sieve, free of sticks, woody roots, stones and other objectionable material, and of such physical condition that it can be readily incorporated with the topsoil. Furnish material conforming to the following criteria:
1. pH value: 3.0 to 5.0.
2. Moisture: Not less than 25 percent nor more than 50 percent.
3. Organic Material: Not less than 47 percent (90 percent dry basis).

B. Wood Chips: Hardwood or softwood chips produced by a standard wood chipping machine, free of leaves, young green growth, wood shavings, sawdust, or any foreign material. Chips shall not exceed 3 inches in greatest dimension.

2.05 SODDING

A. Sod: Turf sod containing 95 percent pure permanent dense growth Kentucky Blue and fine leaved Fescue grasses. Color, leaf texture, and density shall be uniform. Sod shall be free of diseases, nematodes, and insects.
   1. Mowed Height When Harvested: 1-1/2 to 2-1/2 inches.
   2. Thatch: Maximum 1/2 inch.
   3. Weeds:
      a. Free of Bermuda grass, quack grass, Johnson grass, poison ivy, nut sedge, nimble will, Canada thistle, bind weed, bent grass, wild garlic, ground ivy, perennial sorrel, and brome grass.
      b. Containing less than 5 jimson weed, mustard, lamb's quarter, chick weed, cress, or crab grass plants per 100 sq ft.

B. Fertilizer: Commercial fertilizer, 5-10-5 inorganic or organic, containing not less than 5 percent nitrogen, 10 percent available phosphoric acid and 5 percent water soluble potash.
   1. Other fertilizers with a 1-2-1 ratio, such as 10-20-10 or 6-12-6, may be substituted for above.

C. Plant in areas designated on the site plan. Initial watering as per nursery instructions.

2.06 MISCELLANEOUS MATERIALS

A. Stakes, Deadmen and Guy Stakes: Sound, durable White or Red Cedar, or other approved wood, free of insect or fungus infestation.

B. Guy Wire or Cable: No. 12 galvanized iron wire or cable.

C. Tree Wrapping: 4 inch wide strips of jute burlap or waterproof paper 30-30-30 Krinklecraft by Eaton Brothers Corp., P.O. Box 60, Hamburg, NY 14075, (800) 433-3244.

D. Protective Hose: 2-ply garden hose cut to required lengths to protect tree trunk's from damage by wires.

E. Tree Wound Paint: Antiseptic, waterproof, adhesive, elastic tree wound paint containing no kerosene, coal tar, creosote, or other material harmful to cambium or living tissue.

F. Anti-desiccants: Wilt-Pruf by Wilt-Pruf Products, Inc., P.O. Box 469, Essex, CT 06426, (203) 767-7033.

Landscape Fabric: Typar Pro 3301, by Reemay, Inc., P.O. Box 511, Old Hickory, TN 37138-3651, (800) 284-2780.

H. Steel Edging: General Landscape Edging by Joseph T. Ryerson & Son Co. Inc., Chicago, IL, complete with loops pressed from, or welded to face of sections to receive anchor stakes.
   1. Size: 3/16 x 4 inches deep. Anchoring Stakes: Manufacturer's standard 16 inches tapered steel. Finish: Manufacturer's standard green-black painted finish on steel edging and anchoring stakes.

PART 3 EXECUTION

3.01 INSPECTION

A. Plants to be approved at the nursery by Director's Representative prior to being shipped to the site.

B. Do not plant any plant material until after inspection and approval in writing of plant shipments. Secure written approval of any substitutions before planting. Remove rejected material from planting areas.

3.02 PREPARATION

A. Planting Layout:
   1. Stake out tree locations and planting areas.
   2. Obtain layout approval from the Director's Representative prior to excavations of plant pits and beds.

B. Plant Pit Dimensions: Minimum width 12 inches, measured at the ground surface.
   1. Balled and Burlapped Plants:
      a. Pit Depth: Not to exceed the ball depth.
      b. Pit Width: Measured at the ground surface, 3 times the width of the ball or as indicated.
   2. Container Grown Plants: 2 times the diameter of the container measured at the ground surface.
   3. Ground Cover Beds: Excavate entire bed to a depth of 4 inches.
   4. Bare Root Plants: Diameter equal to width of roots spread to natural position plus 24 inches, measured at the ground surface.
   5. Hedge Trenches: 18 inches wide and 18 inches deep.

C. Excavation: Excavate pits to the dimensions specified. Dispose of excavated material of the site unless otherwise directed.

3.03 PLANTING

A. Setting Plants:
   1. Backfill pits with planting soil and firm to the level upon which plants were previously growing. Set plants plumb. Plant budded or grafted

plants 2 inches below bud or graft line. Complete backfilling with planting soil and settle continually with water.

2. Balled Plants: Set plants in position and backfill 1/3 depth of ball. Remove burlap from top and adjust to eliminate air pockets. Complete backfill and settle with water.
3. Bare-root Plants: Set plant in position and place planting soil around roots settling with water. Use care to avoid bruising or breaking roots when firming soil. Prune bruised or broken roots.

B. Wrapping: Wrap deciduous trees within 4 days after planting from the ground line to the height of the second branches. Wrap in a single layer wound spirally starting from base and overlapping 1-1/2 inches. Secure wrapping in place by use of approved staples or other approved methods and materials.

C. Staking: Set tree stakes into solid ground below bottom of plant before backfilling. Place stakes at the outer edge of the roots or ball in line with the prevailing wind at a 10 degree angle from the tree trunk.

D. Anti-Desiccant: Apply anti-desiccant spray to broadleaved ericaceous plants planted in the Fall season, as directed.

E. Landscape Fabric: Install over the planting area to limits indicated. Cut fabric as required to avoid shrubs.

F. Surface Finish: Form saucer as indicated on Drawings or as directed. Grade soil to form a basin on lower side of slope plantings, which will catch and retain water. Top dress basins with fertilizer spread evenly at the rate of 1-1/2 pounds per square yard of plant pit surface. Break saucers and basins before ground freezes.

G. Mulching:
   1. Spread mulch over finished surface of each plant, plant bed and hedge trench in the following amounts:
      a. Wood Chips: 3 inches.
      b. Shredded Wood: 2 inches.
   2. Water plants thoroughly after mulching.

H. Pruning: Prune immediately after planting using sharp tools approved by the Director's Representative. Remove approximately 1/3 of the wood of deciduous plants, maintaining the natural habit of the plant. Cut no leaders. Paint pruning cuts 3 inches in diameter or over with tree wound paint.

I. Guying: Guy deciduous trees 4 inches and over in caliber; trees over 6 feet high with 3 or more stems; and evergreens 6 feet or over in height, with 3 guys immediately after planting. Attach guys to stakes and trees as indicated. Connect multi-stem trees with protected connecting wires maintaining each stems relationship to one another.

J. Establishment of Planting: Maintain plantings immediately following planting operations and continue throughout the guarantee period. Establishment of plantings shall consist of keeping plants in healthy, growing conditions by watering, weeding, cultivating, pruning, spraying, tightening of guys, remulching and by any other necessary operations of establishment. Water all plants at least once a week between April 1 and October 31 with approximately 5 gallons per square yard (1 inch layer of water) per watering unless otherwise directed. Provide additional watering during periods of dry weather when required or when directed. Treat plants with good horticultural preventative or remedial measures to control insects, diseases or rodents.

3.04 INSPECTIONS AND REPLACEMENTS

A. The following inspections apply only to this Section and supersede inspections specified in Section 017716.

1. Physical Completion Inspection and Replacements: Notify the Director in writing at least ten days prior to requested date of physical completion inspection. Remove and replace dead, unhealthy or badly impaired plants according to the original specification, if so directed. Replace plants during the next planting season if this inspection is not within a planting season.

2. End of Guarantee Inspection and Replacements: Remove stakes, guy wires and tree wrapping at the end of the one year guarantee period unless otherwise directed. Remove and replace dead, unhealthy or impaired plants according to original specification, as directed. Replace plantings during the next planting season if end of guarantee period is not within a planting season.

List of Plantings.

1	Acer Platanoides	Norway Maple	1 ½”- 1 ¾”	5	
2	Acer Saccharum	Sugar Maple	1 ½”- 1 ¾”	1	Along Algonquin Street
3	Taxus Cuspidata	Japanese Yew	12”	12	B & B
4	Cornus Florida	Flowering Dogwood	5’-6’	1	B & B
5	Cotoneaster dwaricata	Spreading Cotoneaster	2’-3’	8	B & B
6	Evonymus Slatus Compacta	Burning Bush	2’-3’	1	
7	Juniperus Canarti	Cannarts Juniper	3’-4’	1	B & B
8	Lisqustrum Regalianum	Regalis Privet	2’-3’	24	All along North and West Property lines.

9	Picea Pungens	Spruce	3'-4'	1	B & B
10	Pinus Strobus	White Pine	4'-5'	1	B & B
11	Hederm Helix	English Ivy	2" pots	8	
12		Kentucky Blue Grass			All yard areas indicated.

End of Section