SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Project information.
   2. Work covered by Contract Documents.
   3. Access to site.
   4. Coordination with occupants.
   5. Work restrictions.

1.2 PROJECT INFORMATION

A. Project Identification: Batting Facility Re-Roof; H17-N137-PD
   1. Project Location: 148 Chanticleer Dr. West, Conway, SC 29526.

B. Owner: Coastal Carolina University.
   1. Owner's Representative: Mark Avant, 843-349-2152; avant@coastal.edu.

C. Architect: ADC Engineering, 1226 Yeamans Hall Road, Hanahan, SC 29410; Chris Gilger, PE; 843-566-0161.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:
   1. Removal of existing translucent panels, gutters, brackets, spacers and edge metal on batting facility and replace with new structural standing seam metal roof system including clips, SS fasteners, components and accessories. Contractor shall also install a new coated chain link fence to under siding of existing metal roof system below purlins and other Work indicated in the Contract Documents.

B. Type of Contract:
   1. Project will be constructed under a single prime contract.

1.4 ACCESS TO SITE

A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site 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 Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
   1. Driveways, Walkways, 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 for storage of materials.

C. Condition of Existing Building: Repair damage caused by construction operations.

1.5 COORDINATION WITH OCCUPANTS

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

1.6 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.
   1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Contractor has no limits to working hours.

C. Restricted Substances: Use of tobacco products and other controlled substances on the campus of Coastal Carolina University is not permitted.

1.7 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
   1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
   2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000
SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Execute accepted alternates under the same conditions as other work of the Contract.

C. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. 1: Clean and prep all high and low steel supporting the Cupola for new paint.
1. **Base Bid:** Removal of existing translucent panels, gutters, brackets, spacers and edge metal on batting facility and replace with new structural standing seam metal roof system including clips, SS fasteners, components and accessories. Contractor shall also install a new coated chain link fence to under siding of existing metal roof system below purlins as indicated on Drawings and as specified in Specification Manual.

2. **Alternate:** Add cost to clean and prep all existing high and low steel supporting the Cupola for new paint as indicated on drawing Sheet S101 and as specified in Section 099000 – Painting.

END OF SECTION 012300
SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY
   A. Section includes administrative and procedural requirements for substitutions.

1.2 DEFINITIONS
   A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

   1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.

   2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.3 ACTION SUBMITTALS
   A. Substitution Requests: Submit one copy of each request for consideration. Identify product or fabrication or installation method to be replaced.

   1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

      a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.

      b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.

      c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.

      d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.

      e. Samples, where applicable or requested.

      f. Certificates and qualification data, where applicable or requested.

      g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.

i. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.

j. Cost information, including a proposal of change, if any, in the Contract Sum.

k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.

l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within five days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within seven days of receipt of request.


   b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.4 QUALITY ASSURANCE

   A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.5 PROCEDURES

   A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.6 SUBSTITUTIONS

   A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than ten days prior to time required for preparation and review of related submittals.

   1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
b. Substitution request is fully documented and properly submitted.
c. Requested substitution will not adversely affect Contractor's construction schedule.
d. Requested substitution has received necessary approvals of authorities having jurisdiction.
e. Requested substitution provides specified warranty.

B. Substitutions for Convenience: Not allowed.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500
SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY
   A. Section Includes:
      1. Submittal schedule requirements.
      2. Administrative and procedural requirements for submittals.

1.2 DEFINITIONS
   A. Action Submittals: Written and graphic information and physical samples that require
      Architect's responsive action. Action submittals are those submittals indicated in individual
      Specification Sections as "action submittals."
   B. Informational Submittals: Written and graphic information and physical samples that do not
      require Architect's responsive action. Submittals may be rejected for not complying with
      requirements. Informational submittals are those submittals indicated in individual Specification
      Sections as "informational submittals."

1.3 SUBMITTAL SCHEDULE
   A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in
      chronological order by dates required by construction schedule. Include time required for
      review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include
      additional time required for making corrections or revisions to submittals noted by Architect
      and additional time for handling and reviewing submittals required by those corrections.

1.4 SUBMITTAL FORMATS
   A. Submittal Information: Include the following information in each submittal:
      1. Project name.
      2. Date.
      4. Name of Contractor.
      5. Name of firm or entity that prepared submittal.
      6. Names of subcontractor, manufacturer, and supplier.
      7. Specification Section number
      8. Submittal purpose and description.
      9. Number and title of Specification Section, with paragraph number and generic name for
         each of multiple items.
      10. Drawing number and detail references, as appropriate.
      11. Signature of transmitter.
B. PDF Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

1.5 SUBMITTAL PROCEDURES

A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
   1. Email: Prepare submittals as PDF package, and transmit to Architect by sending via email. Include PDF transmittal form. Include information in email subject line as requested by Architect.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
   1. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on [Architect's] [Construction Manager's] receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
   1. Initial Review: Allow 7 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
   2. Resubmittal Review: Allow 5 days for review of each resubmittal.

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

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

1.6 SUBMITTAL REQUIREMENTS

A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
   1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
   2. Mark each copy of each submittal to show which products and options are applicable.
   3. Include the following information, as applicable:
      a. Manufacturer's catalog cuts.
      b. Manufacturer's product specifications.
      c. Standard color charts.
      d. Statement of compliance with specified referenced standards.
      e. Testing by recognized testing agency.
      f. Application of testing agency labels and seals.
      g. Notation of coordination requirements.
h. Availability and delivery time information.

4. Submit Product Data before Shop Drawings, and before or concurrent with Samples.

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

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
   a. Identification of products.
   b. Schedules.
   c. Compliance with specified standards.
   d. Notation of coordination requirements.
   e. Notation of dimensions established by field measurement.
   f. Relationship and attachment to adjoining construction clearly indicated.

C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.

2. Email Transmittal: Provide PDF transmittal. Include digital image file illustrating Sample characteristics, and identification information for record.

1.7 CONTRACTOR'S REVIEW

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

B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

1.8 ARCHITECT'S REVIEW

A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return it.

1. PDF Submittals: Architect will indicate, via markup on each submittal, the appropriate action.
B. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013300
SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

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

1.2 ACTION SUBMITTALS

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

B. Certified List of Incomplete Items: Final submittal at final completion.

1.3 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

1.4 SUBSTANTIAL COMPLETION PROCEDURES

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

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 5 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, final certifications, and similar documents.
C. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 7 days prior to date the Work will be completed and ready for final inspection and tests. 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.

1.5 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
   1. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
   2. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, 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.

1.6 SUBMITTAL OF PROJECT WARRANTIES

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

B. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

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

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.1 FINAL CLEANING

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

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

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

END OF SECTION 017700
SECTION 02 05 00

DEMOLITION AND REMOVAL

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes the demolition of the following products/accessories/systems to complete the work.

1. Function, access and usage of the facility shall be maintained during the demolition and construction process.

2. Disconnect, relocate, remove and re-install any interior and exterior items required to complete the work.
   a. This includes mechanical, electrical, plumbing or communications equipment.

3. Remove all signage, lights, security cameras, conduits, pipes or other items on the exterior surfaces to permit complete cleaning and preparation of all surfaces.

4. Prepare, prime, and paint in accordance with Section 05 12 05, Steel Structure Paints and Coatings.

5. Selective demolition of metal where rusted, damaged to permit cleaning, preparation, and painting in accordance with Section 05 13 02, Metal Cleaning, Preparation and Painting.

6. Selective demolition to permit repairs to the existing metal roof in accordance with Section 07 41 03, Metal Roof Repairs.

7. Selective demolition to permit repairs to the existing fasica soffit in accordance with Section 07 41 05, Fascia/Soffit Repair.

8. Removal of all other sheet metal components and accessories for replacement in accordance with Section 07 60 00, Sheet Metal.

9. Removal of all accessories in accordance with Section 07 72 00, Roof Accessories.

10. Provide modifications as needed to install required roof access/safety in accordance with Section 07 72 05, Roof Access/Safety.

11. Removal of all other components and accessories for required repairs and modifications to drainpipe connectors in accordance Construction Documents.
12. Removal of all sealants on the systems and adjacent wall surfaces for replacement in accordance with Section 07 92 00, Sealants for Roofing and Sheet Metal.

13. Removal of all sealants on the systems and adjacent wall surfaces for replacement in accordance with Section 07 92 10, Sealants for Building Envelope.

B. Contractor shall immediately notify the Consultant/Engineer and the Owner, in writing, when conditions are uncovered which will affect or deter completion of the work in accordance with the Contract Documents.

C. All demolition shall adhere to ANSI, SCDHEC, and OSHA guidelines and as applicable to Section 01 52 05, Safety Requirements.

D. Safety Plans should include an SDS list of all products being used as part of a system, but also including substances being used to complete the work (i.e. fuels, solvents, cleaners, etc.). This data should be included within the submittal, and a copy kept on the site.

1. SDS sheets are required for all products/materials used for this project. Any products with strong or distinct odors must be identified prior to use and submitted to Consultant/Engineer for review and approval.

E. Building must be protected from inclement weather at all times. Contractor shall have plan and materials (means and methods) to protect area areas during inclement weather.

F. Unit prices and set quantities are included for various items in accordance with Section 01 21 10, Unit Prices and Allowance and documentation is required accordingly.

1.02 RELATED DOCUMENTS

A. The drawings and the provisions of the Instructions to Bidders, General Conditions, and Supplementary Conditions of these specifications shall govern work under this Section.

B. Section 01 52 05: Safety Requirements

1.03 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced, and to provide any clarifications for issues not covered within this specification.

B. AMERICAN NATIONAL STANDARDS INSTITUTE, INC. (ANSI):

1. ANSI/ASSE A10.6 (2016) Safety Requirements for Demolition Operations
2. ANSI/ASSE Z359.1 (2016) Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components

C. INTERNATIONAL CODE COUNCIL (ICC):

D. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA):

E. OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION
   1. 29 CFR 1926 – Safety and Health Regulations for Construction

F. SOUTH CAROLINA DEPARTMENT OF HEALTH & ENVIRONMENTAL CONTROL (SCDHEC):
   1. SCDHEC Regulation 61-107.11, Construction, Demolition and Land-Clearing Debris Landfills

1.04 GENERAL REQUIREMENTS

A. Do not begin demolition until Demolition plan is approved and authorization is received from the Consultant/Engineer.

B. Remove rubbish and debris from the site daily; do not allow accumulation around the building or grounds.

C. Coordinate sequencing and temporary shutdowns with occupants and owner.

1.05 SUBMITTALS

A. Submit the following in accordance with Section 01 33 00, Submittals.

B. No work will begin until all submittals have been received and approved and Pre-Construction Conference has been completed.

C. Demolition Plan:

   1. Submit proposed demolition and removal procedures to the Consultant/Engineer for approval before work is started.

   2. Include procedures for careful removal and disposition of materials while function of building is maintained, a disconnection schedule of affected utility services, and a detailed description of methods and equipment to be used for each operation and of the sequence of operations.

   3. State safety precautions to be used during conduct of demolition work
1.06 REGULATORY AND SAFETY REQUIREMENTS
A. Comply with federal, state, and local hauling and disposal regulations.
   1. In addition to the requirements of the contract clauses, safety requirements shall conform to ANSI A10.6 and applicable OSHA requirements.
B. Contractor shall assure compliance with applicable safety and fall protection requirements of federal, state and local regulations throughout performance of work.
C. The Contractor shall make application to all necessary Building Officials/governing bodies and obtain the required permits for work.

1.07 DUST AND DEBRIS CONTROL
A. Provide adequate protection of areas which will be subject to demolition debris and dust.
B. Clean up all fasteners, drive pins, nails and sheet metal clippings from ground/roof/horizontal surfaces.
C. Contractor shall monitor interior and adjacent spaces during the demolition process.
D. Prevent the spread of dust and debris to the interior portions of the building, to the surrounding grounds, and avoid the creation of a nuisance or hazard in the surrounding area.
E. Removal of existing work shall be coordinated not to affect current building occupants, pedestrians or function/usage of building.
F. Do not damage existing substrate or overload assembly with construction traffic, debris or equipment.
G. Provide protection at roof drains and drain pipes to ensure debris/trash does not enter pipes.
H. Removal of existing work shall be limited to days where low winds (15 mph or less) unless netting/wind shading are used to ensure roof debris is contained and disposed of properly.
I. Do not damage existing exterior surfaces, masonry walls, expansion joints, guy wires, conduits, cables, security equipment, fireproofing, insulation, on underside of the existing roof deck and framing.

1.08 PROTECTION
A. Provide protection system for roofing and adjacent wall surfaces.
B. Traffic Control Signs:
1. Where pedestrian safety is endangered in the area of removal work, use traffic barricades with flashing lights.

2. “Soft” barricades, interior signs and email notifications to occupants when working over entrances/exits.

C. Ingress/Egress Protection:

1. During the construction period, exits from the building(s) shall not be blocked or impaired without expressed approval of the Agency Life, Safety/Fire Protection Officer

2. Overhead protection and traffic control signs required at all ingress/egress points affected by this work including thoroughfares and adjacent facilities.

D. Existing Work:

1. Protect existing work, which is to remain in place or be reused.

2. Protect grass, shrubbery and all horizontal (asphalt, concrete and landscaping) surfaces as well as adjacent roof and wall surfaces.

3. Repair items, which are to remain and which are damaged during performance of the work to their original condition or replace with new.

4. Do not overload existing structural system.

5. Interior:
   a. The interior of the building shall be protected at all times from dust, debris, materials and equipment associated with the roof construction.
   b. Safety, the uninterrupted function of the building and the protection of the interior contents shall be maintained at all times.
   c. Disconnect, relocate, remove and re-install any interior items required to complete the work.

E. Weather Protection:

1. Building must be protected from inclement weather at all times. Contractor shall have plan and materials (means and methods) to protect areas during inclement weather.
   a. Ensure safety plan includes hurricane preparation and procedures for project.

2. For portions of the building to remain, protect building interior and materials and equipment from the weather at all times.
3. When removal of the existing roofing system is accomplished, have the materials and workmen ready to provide adequate and temporary covering of exposed areas during inclement weather and at the end of each day's construction.

F. Facilities:

1. It is the Contractor's responsibility to return the structure and any damaged items to their original condition.

2. Protect all exterior walls, fenestrations, grounds, mechanical and electrical services, and accessories during the demolition process.

3. Temporary removal/disconnection of utilities during the demolition process; shall be accomplished by qualified craftsman.

4. All interruptions in service shall be coordinated with the Consultant/Engineer and Owner.

5. All surfaces damaged or stained during the construction process shall be the Contractor's responsibility to return to its original condition.

G. Adjacent Surfaces:

1. The Contractor shall return to its original state, any damaged shrubbery, grass, concrete, skylights, equipment or other adjacent surface.

1.09 RELOCATIONS

A. Perform the removal and reinstallation of the relocated items as indicated with workmen skilled in the trades involved.

B. Repair items to be relocated, which are damaged or replace damaged items with new undamaged items as approved by the Consultant/Engineer.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

3.01 EXISTING FACILITIES

A. Existing Facilities are to be removed as specified, noted or as necessary to accomplish work.

B. Roof Replacement:

1. Remove the entire roofing systems (including all underlayment systems) and all related components as required to complete the work.
2. Damaged substrates and moisture is noted to be trapped within these roof systems.

3. Remove roofing and associated accessories without damage to the adjacent surfaces and roof decks.

C. Sealants in Building Envelope

1. Remove existing, liquid-applied sealant/backer rod and preform sealant joints from area of work and complete work in accordance with Section 07 92 10, Sealants for Building Envelope.

2. Extents of work shall be limited to extents specified.

D. General M/E/P Work Specific to Roof Replacement

1. Disconnect and remove all rooftop mechanical and electrical equipment as necessary to affect roof work in the areas and reinstall upon completion of the work in the area to minimize down time. Provide for extension and modification of service. Utilities, interior components and all connections as necessary to accommodate new heights and locations.

2. Any lightning protection, cables, wires, satellite or microwave dishes, antennas and rooftop mechanical, electrical or electronic components shall be temporarily disconnected and reconnected each day by qualified craftsman. This includes roof areas, walls, flashings and adjacent wall areas.

3. Extend / raise all penetrations, curbs, mechanical, electrical and plumbing components to a minimum 8 inches above the finished roof surface. Provide for extension and modification of service, utilities, interior components and all connections as necessary to accommodate new heights and locations.

4. The underside of the deck and interior of walls has fixtures/conduits/cables and attachments. Contractor shall have qualified craftsman remove and reinstall all affected items related to the completion of the scope of this project.

5. Ensure any M/E/P systems which require a specific contractor to complete the work (i.e. Johnson Controls, Honeywell, Trane, Etc.) are included in the Bid.

3.02 DISPOSITION OF MATERIALS

A. Title of Materials:

1. Except where specified in other sections, all materials and equipment removed, and not reused, shall become the property of the Contractor and shall be removed from the job site.
2. Title to the materials resulting from demolition, and materials and equipment removed, is vested in the Contractor upon approval by the Consultant/Engineer of the Contractor's demolition and removal procedures, and authorization by the Consultant/Engineer to begin demolition.

3. The Owner will not be responsible for the condition or loss of, or damage to, such property after notice to proceed.

B. Reuse of Materials and Equipment:

1. Remove and store materials and equipment to be reused to prevent damage, and reinstall as the work progresses.

3.03 CLEANUP

A. Remove and transport debris and rubbish in a manner that will prevent spillage on streets or adjacent areas.

3.04 UNIT PRICED QUANTITIES

A. In accordance with Section 01 21 10, Unit Prices and Allowance, the Contractor shall maintain a log of all repair unit priced quantities used based on contract requirements.

B. Contractor shall notify Owner in writing when 80% of quantity is used for each unit price item.

C. Provide photograph or videotape documentation of repairs.

D. Locate quantities and show their locations on the drawings.

E. Provide actual used quantities on each Application for Payment request.

END OF SECTION 02 05 00
SECTION 074214 – THRU-FASTENED METAL ROOFING (NO INSULATION)

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes a new preformed thru-fastened metal roof system (similar to "R" panel) to be provided over structural framing as indicated on drawings.

1. Complete removal of existing polycarbonate panels/accessories down to the structural framing.

2. Removal and replacement of gutters and square and round downspouts.

B. This system consists of a thru-fastened metal roof system adhering to the structural requirements/uplift forces noted on the drawings.

1. Existing wall panels and louvers to be reused, removed and modified accordingly for new flashing at roof to wall transition.

2. A plastic-coated chain link fence is to be attached to the underlying/bottom of the framing per the Structural drawings.

C. The slopes are indicated on the structural drawings, the roof areas and roof types on the roof drawings.

D. A Kynar 500 (PVDF) finished metal panel of aluminum or galvalume shall be used for this project. All sheet metal accessories shall match metal panel in type and color.

1. Kynar source/color to be selected by Owner from full color selection options, including custom colors.

E. The sheet metal flashings and accessories are specified in Sheet Metal for Roofing and the required details for the various penetrations and terminations are as shown on the contract drawings.

1. See drawings for the dimensions and configurations for terminations and transition details such as gutters, edge metals and counterflashings.

1.02 RELATED DOCUMENTS

A. The drawings and the provisions of the Instructions to Bidders, General Conditions, and Supplementary Conditions of these specifications shall govern work under this Section.

B. See Structural Specifications

1.03 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced, and to provide any clarifications for issues not covered within this specification.
B. AMERICAN IRON AND STEEL INSTITUTE (AISI):

1. AISI SG 973 (Latest Edition) Cold Formed Steel Design Manual

C. ASTM INTERNATIONAL (ASTM):

5. ASTM C 879 (2014) Release Papers Used with Preformed Tape Sealants
10. ASTM D 1654 (2016) Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments

D. INTERNATIONAL CODE COUNCIL

E. NATIONAL ROOFING CONTRACTORS’ ASSOCIATION (NRCA):


F. SHEET METAL & AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION (SMACNA):


G. UNDERWRITERS LABORATORIES, INC. (UL):


1.04 PERFORMANCE REQUIREMENTS

A. Wind Loads

1. The system shall be approved/sealed by a registered structural engineer in the State of South Carolina adhering to the structural requirements of the Contract Documents.

2. Design shall be based on the IBC 2018 and provide for increased attachment at defined corners and perimeters. Roof panel, thru-fastened metal roof panel.

   a. The laps shall include a continuous tape/sealant when required by the manufacturer to withstand the rainfall and wind specified in paragraph entitled "Manufacturer's Requirements."

   b. Double closures (hidden) are required at apex, ridge, half ridge and hips.

   c. The system shall resist the positive and negative loads specified herein in accordance with "Sheet Building Sheathing Design Guide" of the AA 30.

   d. Provide any secondary framing at perimeters and corners as required to attach the thru-fastened metal roof panel to adhere to the structural requirements.

3. In addition to the above wind load criteria, the basic roof panel configuration shall have:

   a. A current, minimum Class 90 rating in accordance with UL 580 in the name of the metal roof system manufacturer.

   b. Field and perimeter uplift forces calculated in accordance with ASTM E 1592, and results provided in submittals.
B. Resistance to Water Infiltration
   1. Roofing system shall show no infiltration at laps, edges, flashings, counter flashings and penetrations when subjected to a rainfall of 5 inches per hour with 124 mph wind.
   2. Test results provided for water resistance through system in accordance with ASTM E 1646.
   3. Test results for air leakage through system in accordance with ASTM E 1680.

C. Thermal Movement
   1. The system shall be capable of withstanding thermal movement based on a temperature range of 10 degrees F below design low air temperature and 180 degrees F design high temperature.

1.05 SUBMITTALS

A. Submit the following:

B. No work will begin until all submittals have been received and approved and Pre-Construction Conference has been completed.

C. Manufacturer's Catalog Data
   1. Roofing panels, Thru-fastened metal
   2. Attachment clips / z closures
   3. Closures (apex, ridge, half ridge and hip)
   4. Accessories
   5. Sample warranty
   6. Stainless steel fasteners with EPDM or navy neoprene for metal wall panels/louvers to be reused.
   7. Submit data sufficient to indicate conformance to specified requirements.

D. Drawings
   1. Roofing Panels, Thru-Fastened
      a. Submit drawings as necessary to supplement the instructions and diagrams.
      b. Show typical and special conditions including flashings, accessory installation, materials and thicknesses, all dimensions, anchoring methods, sealant locations, sealant tape locations, fastener layout, sizes, spacing and provisions for thermal movement.
      c. The manufacturer's technical engineering department shall approve the drawings before they are submitted.
E. Design Data

1. Load Calculations:
   a. Specific to metal roof assembly, submit load calculations for the following by a structural engineer registered as a Professional Engineer in the State of South Carolina, verifying that the system supplied meets the design loads indicated (see structural requirements).
   b. Coordinate calculations with manufacturer's test results.
     1) Wind load uplift design pressure at roof locations specified in paragraph entitled "Wind Loads."
     2) Specific information pertaining to corners, ridges and perimeters shall be included, including their defined locations on the roof plans.
     3) Clip spacing and allowable load per clip calculations.
     4) The fastening of clips to structure or intermediate support spacing.
     5) Intermediate support spacing and fastening to structure when required.
     6) Allowable panel span at anchorage spacing indicated.
     7) Safety factor used in determining loading.

F. Sealant

1. Sealant Instructions: Submit thru-fastened metal roof system manufacturer's sealant requirements for making the standing seam watertight when subjected to 5 inches of rainfall per hour simultaneous with 124 mile per hour winds.

G. Statements

1. Technical Representative
2. Qualification of Installer
   a. Submit documentation proving the installer is factory trained, has the specified experience and is authorized by the manufacturer to install the products specified.

H. Reports

1. Manufacturer's Field Inspection
   a. Submit manufacturer's technical representative's inspection reports as required in paragraph entitled "Manufacturer's Field Inspection."
2. Test Reports
   a. Panel Finish: Submit reports of the tests required by this section and by referenced publications.
   b. The testing shall have been performed by an approved laboratory.
   c. Test reports on previously tested materials shall be accompanied by certificates from the manufacturer certifying the previously tested material is of the same type, quality, manufacture and make as that proposed for this project.

I. Samples
   1. Roofing panels: Submit a 12 inch long section of typical panel in color indicated.
   2. Accessories: Submit each type of accessory item used in the project including, but not limited to each type of anchor clip, closures, fasteners and leg clamps.

II. Sealants

III. Sealant Tape

IV. Color Selection Samples
   a. Roofing panels
   b. When colors are not indicated, submit samples of not less than twelve different manufacturer's standard colors for selection.

J. Records
   1. Information Card(s)
      a. For each assembly, submit a photocopy or typewritten information card containing the information as listed at the end of this section.

K. Safety Data Sheets (SDS): Submit Safety Data Sheets with each specification section and include with Safety Plan.

1.06 QUALITY ASSURANCE

A. Pre-construction conference
   1. After submittals are received and approved but before roofing work, including associated work, is performed, the Consultant/Engineer will hold a pre-construction conference to review the following:
      a. The drawings and specifications.
b. Procedure for onsite inspection and acceptance of the roofing substrate and pertinent structural details relating to the roofing system.

c. Contractor's plan for coordination of the work of the various trades involved in providing the roofing system and other components secured to the roofing.

d. Safety requirements.

2. The pre-construction conference shall be attended by the Contractor and personnel directly responsible for the roofing installation, mechanical and electrical work, and the roofing manufacturer's technical representative.

3. Conflicts among those attending the pre-construction conference shall be resolved and confirmed in writing before roofing work, including associated work, is begun.

B. Manufacturer's Technical Representative

1. The representative shall have authorization from manufacturer to approve field changes and be thoroughly familiar with the products and with installations in the geographical area where construction will take place.

2. The manufacturer's representative shall be an employee of the manufacturer with at least 5 years experience in installing the roof system.

C. Qualification of Installer

1. The roofing system installer shall be factory trained, approved by the metal roofing system manufacturer to install the system, and shall have a minimum of three years experience as an approved applicator with that manufacturer.

2. The applicator shall have applied three installations of similar size and scope as this project within the previous 5 years.

D. Single Source

1. Provide roofing panels, clips, closures and other accessories from a single manufacturer.

E. Manufacturer

F. The thru-fastened metal roof ("R") panel shall be the product of a recognized thru-fastened metal roof ("R") panel manufacturer who has been in the practice of manufacturing thru-fastened metal roof ("R") panel for a period of not less than 5 years and has been involved in at least 5 projects similar in size and complexity to this project.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle preformed panels, bulk roofing products and other manufactured items in a manner to prevent damage or deformation.
B. Delivery
   1. Provide adequate packaging to protect materials during shipment.
   2. Do not uncrate materials until ready for use except for inspection.
   3. Immediately upon arrival of materials at jobsite, inspect materials for damage, dampness, and staining.
   4. Replace damaged or permanently stained materials that cannot be restored to like new condition with new material.
   5. If materials are wet, remove moisture, restack and protect panels until used.

C. Handling
   1. Handle material carefully to avoid damage to surfaces, edges and ends.

D. Storage
   1. Stack materials stored on the site on platforms or pallets and cover with tarpaulins or other suitable weathertight coverings which prevent water trapping or condensation.
   2. Store panels so that water which might have accumulated during transit or storage will drain off.
   3. Do not store the panels in contact with materials that might cause staining, such as mud, lime, cement, fresh concrete or chemicals.
   4. Protect stored panels from wind damage.

1.08 WARRANTY

A. Contractor and manufacturer warranties shall be exclusive and independent of each other. Each warranty shall run directly to the Owner and be dated the substantial completion date or later.

B. Furnish contractor warranty for specific system as provided at the end of this section. In no event shall warranty period be less than three (3) years from the date of substantial completion of the work.
   1. If the Contractor fails to perform repairs within seventy-two (72) hours of written notification, the warranty will not be voided because of work being performed by others to repair roofing regardless of manufacturer's warranty to the contrary.

C. Manufacturer's Warranty
   1. Furnish manufacturer's no monetary limitation (no-dollar-limit) materials and workmanship warranty for the system. The warranty period shall be not less than
10 years from the date of substantial completion. The warranty shall be issued directly to the Owner. The warranty shall provide that if within the warranty period the system becomes non-watertight or shows evidence of failure, rupture or excess weathering due to deterioration of the system resulting from defective materials or installed workmanship the repair or replacement of the defective materials and correction of the defective workmanship shall be the responsibility of the manufacturer. Repairs that become necessary because of defective materials and workmanship while the system is under warranty shall be performed within 7 days after notification, unless additional time is approved by the Owner. Failure to perform repairs within the specified period of time will constitute grounds for having the repairs performed by others and the cost billed to the manufacturer.

PART 2 - PRODUCTS

2.01 ROOFING PANELS

A. Roof Assembly

1. Size: 36” width and continuous panels (see New Roof Plan).

2. Profile: Major longitudinal ribs 1 1/4” deep spaced 12” on center, minor longitudinal ribs spaced maximum 4” on center.

3. Panel: Smooth with intermediate, raised rib/stiffener groove for added stiffness and reduction of oil canning.

4. Configuration

   a. Panels shall be a maximum 36 inches wide with a minimum 1.25 inch high longitudinal ribs spaced 12” on center and raised minor longitudinal rib/stiffener groove at approximately 4 inches on center between the legs.

5. System for securing the roof covering to roof framing shall be exposed thru-fastened system with fasteners penetrating the panels where indicated or approved by Consultant/engineer.

6. Ends of panels at end laps shall be pre-drilled or pre-punched; factory prepare ends of panels to be lapped by trimming part of seam, die setting or swaging ends of panels.

7. Provide panels of continuous lengths with no joints or seams from ridge to eaves except where indicated or approved by Consultant/engineer. Smooth or smooth with raised intermediate ribs for added stiffness.

B. Material

1. Galvalume for aluminum zinc alloy coated steel conforming to ASTM A 792, AZ50 coating.
C. Thickness
   2. Greater thickness may be required to meet other requirements of specifications based on manufacturer's system selected.

D. Finish
   1. Exterior finish shall consist of a 70 percent Polyvinylidene fluoride resin base coating applied to a cleaned, pretreated and primed surface.
   2. Color: To be selected by Owner from custom color options. Under siding of the roof panel, any light color, not white or off white.
   3. The exterior color finish shall meet the test requirements specified. See laboratory test requirements for panel finish within this section.
   4. Interior face shall receive white coating system, or, at the manufacturer's option, receive an acrylic wash coat applied to a minimum total dry film nominal thickness of 0.20 mil.

2.02 ACCESSORIES
A. Required Accessories.
   1. Sheet metal flashings
   2. Trim
   3. Closure strips: double or redundant closures at all panel terminations are required unless end dams are incorporated into panels.

B. Closures
   1. Ridge/Hip Closure
      a. Double or redundant closures at all panel terminations are required unless end dams are incorporated into panels.
      b. Metal clad foam or metal closure with foam secondary closure matching panel configuration for installation on surface of roof panel between panel ribs at ridge and head wall roof panel flashing conditions and terminations.
      c. Foam material, noted above, shall not absorb water.
   2. Rib Closure
      a. Sheet metal clad with closed cell or solid cell synthetic rubber, neoprene or polyvinyl chloride pre molded to match configuration of rib opening.
      b. Material for closures shall not absorb water.
C. Other Requirements:

1. Other similar sheet metal accessories provided in conjunction with preformed metal panels shall be of the same material and finish as panels, except that such items which will be concealed after installation may be provided without the finish if they are aluminum or stainless steel.

2. Metal shall be of thickness not less than that of panels.

3. Molded closure strips shall be closed cell synthetic rubber, neoprene, or polyvinyl chloride pre-molded to match configurations of preformed metal panels.

4. Thermal spacer blocks and other thermal barriers at concealed fasteners shall be provided and installed as recommended by the roofing panel manufacturer.

D. Fasteners

1. Series 300 stainless steel with composite metal and neoprene composition washers shall be used for attachment into wood.

2. All other fasteners shall be stainless steel or cadmium plated inserted into pre-drilled holes and approved by thru-fastened metal roof system manufacturer.

3. Unless specified otherwise herein, fasteners shall be either self tapping screws, bolts and nuts, or self locking bolts.

4. Design fastening system to withstand design loads indicated.

5. Fasteners shall not be over torqued and shall develop full capacity of attachment clips.

6. Screws: Provide not less than No. 14 diameter for self tapping type and not less than No. 12 diameter for self drilling and self tapping.

7. Bolts: Provide not less than 1/4 inch diameter, shouldered or plain shank as required, with proper nuts.

8. Automatic End Welded Studs: Provide shouldered type with a shank diameter of not less than 3/16 inch and cap or nut for holding covering against the shoulder.

9. Rivets
   a. Blind rivets shall be aluminum with 3/16-inch nominal diameter shank or stainless steel with 1/8 inch nominal diameter shank.
   b. Rivets shall be threaded stem type if used for other than fastening trim.
   c. Rivets with hollow stems shall have closed ends.
E. Sealants

1. Shall adhere to and meet the following:
   
a. Elastomeric type containing no oil or asphalt. Exposed sealant shall cure to a rubberlike consistency.

b. Concealed sealant shall be the non hardening type. Seam sealant shall be factory applied, non skinning, non drying, and shall conform to the roofing manufacturer's recommendations.

c. Silicone based sealants shall not be used in contact with finished metal panels and components unless requested in writing and approved otherwise by the Consultant/Engineer.

d. Sealant Tape, Butyl

e. Polyvinyl chloride closed cell foam tape or composed of 99 percent solids in a base of butyl polyisobutylene rubber with the following properties and characteristics:

   1) Webbing and Elongation: 100% minimum at 77 degrees F

   2) Adhesion: Excellent to surfaces used UV light exposure: No effect

   3) Ozone: No effect

   4) Weathering: 1000 hours in QUV Test Apparatus Excellent, no cracking, bleeding, or significant changes.

   5) Moisture Transmission: 0.05 to 0.15 grams per 100 square inches in 24 hours.

   6) Service Temperature Tests:

      a) Bending over 1/2 inch mandrel at 60 degrees F with no cracking.

      b) Expose sealed typical metal lap joint to +350 degrees F for 24 hours with no significant loss of original properties.

   7) Reaction to Metals: Non corrosive to metals

2.03 LABORATORY TESTS FOR PANEL FINISH

A. Previously manufactured panels of the same type and finish as proposed for the project shall have been tested by an approved testing laboratory to ensure conformance to specifications.

B. The term "appearance of base metal" refers to the aluminum or aluminum zinc alloy coated steel base metal. Panels shall meet the following test requirements.
1. Salt Spray Test
   a. Panels shall withstand a salt spray test for a minimum of 2000 hours in accordance with ASTM B 117, including the scribe requirement in the test.
   b. Immediately upon removal of the panel from the test, coating shall receive a rating of 10, no blistering, as determined by ASTM D 714; and a rating of 7, 1/16 inch failure at scribe, as determined by ASTM D 1654, Rating Schedule No. 1.

2. Formability Test
   a. For formability test, when subjected to a 180 degree bend over a 1/8 inch diameter mandrel in accordance with ASTM D 522, exterior coating film shall show only micro-checking of the exterior film and there shall be no loss of adhesion.

3. Accelerated Weathering Test
   a. Panels shall withstand an accelerated weathering test for a minimum of 2000 hours in accordance with ASTM G 23 or ASTM D 2565 without cracking, peeling, blistering, loss of adhesion of the protective coating, or corrosion of the base metal.
   b. Protective coating that can be readily removed from the base metal with a penknife blade or similar instrument shall be considered to indicate loss of adhesion.

4. Chalking Resistance
   a. After the 2000 hour weatherometer test, exterior coating shall not chalk greater than No. 8 rating when measured in accordance with ASTM D 4214 test procedures.

5. Abrasion Resistance Test for Color Coating
   a. When subjected to the falling sand test in accordance with ASTM D 968, coating system shall withstand a minimum of 65 liters of sand per mil of coating thickness before appearance of base metal.

6. Humidity Test
   a. When subjected to a humidity cabinet test in accordance with ASTM D 2247 for 1000 hours, a scored panel shall show no signs of blistering, cracking, creepage or corrosion.

7. Fire Hazard
   a. The finish on factory fabricated panels shall have a flame spread rating of not more than 75 when tested in accordance with ASTM E 84.
8. Gloss
   a. The gloss of the finish shall be 30 plus or minus 5 at an angle of 60 degrees, when measured in accordance with ASTM D 523.

PART 3 - EXECUTION

3.01 EXAMINATION
   A. Examine surfaces to receive thru-fastened metal roofing and flashing.
   B. Provide plumb and true surfaces, clean, even, smooth and as dry as possible.
   C. Ensure that surfaces are free from defects and projections which might affect the installation.
   D. Report unsuitable conditions to the Consultant/Engineer.

3.02 PROTECTION OF DISSIMILAR METALS
   A. Where a galvalume component is in contact with, fastened to, or contacted by drainage from dissimilar metals other than stainless steel, give such dissimilar metals one of the following treatments:
      1. A heavy brush coat of primer followed by two coats of aluminum metal and masonry paint.
      2. A heavy coat of alkali resistant bituminous paint.
      3. Separate contact surfaces with non-absorptive tape or gasket.
   B. Contact with Masonry: Where galvalume is in contact with masonry, concrete, or plaster, apply a heavy coat of alkali resistant bituminous paint.
   C. Contact with Wood: Where galvalume is in contact with wood or other absorptive material subject to wetting, or with wood treated with a preservative not compatible with galvalume, seal joints with sealing compound and apply one heavy brush coat of galvalume pigmented bituminous paint.

3.03 INSTALLATION
   A. General:
      1. Install in accordance with approved manufacturer's erection instructions shop drawings, and diagrams, except as specified otherwise herein.
      2. Provide panels in full and firm contact with clips.
3. Obtain approval prior to installation on prefinished panels cut in the field, and factory applied coverings or coatings that were repaired after being abraded or damaged during handling or installation. Make repairs with material of same color as weather coating.

4. Completely seal openings through panels.

5. Correct defects or errors in materials in an approved manner.

6. Replace materials that cannot be corrected in an approved manner with new materials.

7. Provide molded closure strips where indicated and where necessary for weathertight construction.

8. Use a spacing gage at each row of panels to ensure that panel width is not stretched or shortened.

B. Roof Panels

1. Apply roofing panels with thru-fastened metal roof laps parallel to slope of roof.

2. Provide roofing panels in full lengths from ridge to eaves, with no transverse joints except at the junction of any openings.

3. Form interlocking rib type panel seams in the field with an automatic mechanical seamer approved by the manufacturer.

4. Attach panels to structure with concealed clips that are incorporated into the panel seams.

5. Clip attachment shall allow roof to move freely and independently of the structure, except at fixed points as indicated.

C. Flashings

1. Adhere to the requirements of the Contract Documents and any clarifications shall follow the NRCA Construction Details for Metal Roofing.

2. Provide flashing and related closures and accessories in connection with preformed metal panels as indicated and as necessary to provide a weathertight installation.

3. Install flashing to ensure positive water drainage away from roof penetrations. Flash and seal roof at ridge, eaves and rakes, at projections through roof, and elsewhere as necessary.

4. Accomplish placement of closure strips, flashing, and sealing material in an approved manner that will ensure complete weathertightness.
5. Details of installation, which are not indicated or any clarifications needed shall be in accordance with the latest editions of the NRCA and SMACNA whichever is more stringent.

6. Installation shall allow for expansion and contraction of flashing and thru-fastened metal roof system.

D. Flashing Fasteners

1. Fastener spacings shall be in accordance with drawings and as necessary to withstand the indicated design loads.

2. Drive exposed penetrating type fasteners normal to the surface and to a uniform depth to seat gasketed washers properly and drive so as not to damage factory applied coating.

3. Exercise extreme care in drilling pilot holes for fasteners to keep drills perpendicular and centered. Do not drill through sealant tapes.

4. After drilling, remove metal filings and burrs from holes prior to installing fasteners and washers.

3.04 CLEANING

A. Clean exposed sheet metal work at completion of installation.

B. Remove metal shavings, filings, nails, bolts, and wires from roofs on completion to prevent discoloration and harm to the panels and flashing.

C. Remove grease and oil films, excess sealants handling marks, contamination from steel wool, fittings and drilling debris and scrub the work clean.

D. Exposed metal surfaces shall be free of dents, creases, waves, scratch marks, and solder or weld marks.

3.05 MANUFACTURER'S FIELD INSPECTION

A. Manufacturer's technical representative shall visit the site as necessary during the installation process to ensure roofing system, flashings, and other components are being installed in a satisfactory manner.

1. Owner shall be notified in writing three (3) days prior to the site visit.

B. Manufacturer's technical representative shall perform a field inspection of the installation at substantial completion and prior to issuance of warranty.

C. Within three (3) days, after each site visit, a report, signed by the manufacturer's technical representative, shall be submitted to the Consultant/Engineer noting the overall quality of work, deficiencies and any other concerns, and recommended corrective actions in detail.

D. Notify Consultant/Engineer a minimum of three (3) working days prior to site visit by manufacturer's technical representative.
3.06 COMPLETED WORK

A. Completed work shall be plumb and true without oil canning, dents, ripples, abrasion, rust, staining, or other damage detrimental to the performance or aesthetics of the completed roof assembly.

3.07 INFORMATION CARD(S)

A. Install a photoengraved or etched aluminum information card (for exterior display) at location to be determined by Consultant/Engineer. Information listed on the Information Card is located at the end of this section.

B. A card shall be provided for each differing assembly and be a minimum size of 8-1/2 by 11 inches.

C. Secure with removable stainless-steel screws at approved location.

D. A hard copy of each card is required in the Close-Out Documents.

END OF SECTION 074214
THRU-FASTENED METAL ROOFING SYSTEM (NO INSULATION) INFORMATION CARD

1. Facility: ________________________________

2. Location: ________________________________


6. Deck/Substrate Type: ________________________________

7. Slopes of Deck/Roof Structure: ________________________________

8. Underlayment System: N/A

9. Felt: N/A Waterproofing Underlayment: N/A

10. Thru-Fastened Metal Roof System Description:
    a. Manufacturer (Name, Address, Phone No.): ________________________________

    b. Product Name: ________________________________ Width __________________


11. Repair of Color Coating:
    a. Coating Manufacturer (Name, Address, Phone No.): ________________________________

    b. Product Name: ________________________________

    c. Surface Preparation: ________________________________

    d. Recoating Formula: ________________________________

    e. Application Method: ________________________________

12. Statement of Compliance or Exception: ________________________________

13. Date Roof Completed: ________________________________

14. Warranty Period: Contractor: ____________ Manufacturer: ____________

15. Roofing Contractor (Name/Address): ________________________________

16. Prime Contractor (Name/Address): ________________________________

__________________________            ____________________
Contractor's Signature              Date

__________________________            ____________________
Inspector's Signature              Date
THRU-FASTENED METAL ROOF SYSTEM (NO INSULATION)

CONTRACTOR WARRANTY

WHEREAS, (Name and Address) Telephone: (Telephone Number) herein called the "Roofing Contractor", has performed thru-fastened metal roof system work on the following project:

Owner: (Name and Address)
Address: (Address)
Telephone: (Telephone Number)

WHEREAS, the Prime Contractor has contracted to warrant said work against leaks and faulty or defective materials and workmanship for the designated Warranty Period; NOW, THEREFORE, the Prime Contractor hereby warrants, subject to the terms and conditions herein set forth, that during the Warranty Period Prime Contractor will at its own cost and expense, make or cause to be made such repairs to or replacements of said work thereof as are necessary to correct faulty and defective work to the satisfaction of the Owner, and as are necessary to maintain said work in a watertight condition. Prime Contractor warrants the said work as required, related and applicable to all Specification Sections and the drawings of the Contract Documents.

This Warranty is made subject to the following terms and conditions:

1. Warranty covers only repairs made by Prime Contractor to said building envelope (roofing and sheet metal) components of the systems within the scope of work under this contract and does not cover work by others or future defects not directly attributable to work performed.

2. Specifically excluded from this Warranty are damages to the work caused by: a) lightning, hurricane force winds, hailstorm, and other unusual phenomena of the elements; b) fire c) failure of the building envelope (roofing and sheet metal) system resulting from substrate settlement, excessive deflection, deterioration, and decomposition; d) faulty construction of walls not included in Contract Work, copings, vents, equipment supports, and other edge conditions and penetrations not included in the project; and e) activity related damages of Thru-Fastened Metal Roofing (No Insulation)

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the building envelope (roofing and sheet metal) by others including construction contractors, maintenance personnel, other persons (including vandalism by non-building envelope (roofing and sheet metal), animals and change in building function which subjects said building envelope (roofing and sheet metal) elements to hazardous chemicals not present during or before Contractor's work whether authorized or unauthorized by Owner. When the work has been damaged by any of the foregoing causes, the Warranty shall be null and void for the specific locations affected until such damage has been repaired by the Owner or by another responsible party as so authorized and designated.

3. Other portions or parts of this building not within the scope of this work are not covered under this Warranty.

4. The Prime Contractor is responsible for damages to the facility caused by the scope of work for this project covered by this Warranty.

5. During the Warranty Period, if the Owner allows alteration of the work by anyone other than the Prime Contractor without written consent of the Prime Contractor, including cutting, patching and maintenance in connection with penetrations, alteration of said flashings, attachment of other work, and positioning of anything on the building envelope (roofing and sheet metal) system, this Warranty shall become null and void at the specific locations upon the date of said alterations, but only to extent said alterations affect work covered by this Warranty. If the Owner engages the Prime Contractor to perform said alterations, the Warranty shall not become null and void, unless the Prime Contractor, prior to proceeding with alteration work, shall have notified the Owner in writing, showing reasonable cause for claim that said alterations would likely damage or deteriorate the work as warranted, thereby reasonably justifying a termination of this Warranty in the area of the altered work.

6. During the Warranty Period, if the original use of the building envelope (roofing and sheet metal) is changed and it becomes used for use other or service more severe than originally specified, this Warranty shall become null and void at the specific locations upon the date of the said change, but only to the extent said change affects work covered by this Warranty.

7. The Owner shall promptly notify the Prime Contractor of observed, known or suspected leaks, defects, failures or deterioration, and shall afford reasonable opportunity for Prime Contractor to inspect the work, and to examine the evidence of such leaks, defects or deterioration regardless of the direct cause or causes.

8. Contractor will promptly inspect reported issues/leaks and if found to be attributed to work performed as part of the scope of this project, make the required repairs within 72 hours of written notification.

a. If leaks are found to be from other sources beyond the scope of this warranty, Contractor shall so inform the Owner and make the needed repairs. There will be no charge for this first service call.

b. Future service calls and leak repairs not attributed to contractors work will be for Owner's account. Cost of repairs will be at a fair and reasonable rate. Materials required will be at a maximum of cost plus 15%.

c. If the Prime Contractor fails to perform repairs in allotted time frame assigned herein this warranty, this warranty will not be voided by the Prime Contractor because of work performed by Others to repair deficient conditions regardless of whether repairs by Others are temporary or permanent in nature.
9. This Warranty is recognized to be the only warranty of the Prime Contractor on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to him in cases of building envelope (roofing and sheet metal) failure. Specifically, this Warranty shall not operate to relieve the Prime Contractor of his responsibility for performance of the original work, regardless of whether the Contract was a contract directly with Owner, or a subcontract with Owner's General Contractor.

10. If an extended warranty is required during the course of construction, the more stringent requirements shall take precedence.

IN WITNESS WHEREOF, this instrument has been duly executed this day of 20

Prime Contractor's Signature:

Typed Name:

As Its (position):

Date:

________________________________________
SECTION 09 90 00

PAINTING

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes surface preparation, painting, and finishing of exposed exterior items and surfaces.

B. Surface preparation, priming, and finish coats specified are in addition to shop-priming and surface treatments.

C. Paint exposed surfaces whether or not colors are designated in the schedules, except where a surface or material is specifically indicated not to be painted or is to remain natural. Where an item or surface is not specifically mentioned, paint the same as similar adjacent materials or surfaces. If color or finish is not designated, the Consultant/Engineer will select from standard colors or finishes available.

1.02 RELATED DOCUMENTS

A. The drawings and the provisions of the Instructions to Bidders, General Conditions, and Supplementary Conditions of these specifications shall govern work under this Section.

1.03 SUBMITTALS

A. Submit the following in accordance with Section 01 33 00, Submittals.

B. No work will begin until submittals have been received and approved, and Pre-Construction Conference has been completed.

C. Product data for each paint system specified, including primer.

1. Provide the manufacturer's technical information including label analysis and instructions for handling, storage, and application of each material proposed for use.

2. List each material and cross-reference the specific coating, finish system, and application. Identify each material by the manufacturer's catalog number and general classification.

D. Samples for initial color selection in the form of manufacturer's color charts. After color selection, the Architect will furnish color chips for surfaces to be coated.

E. Applicator Qualifications

1. Engage an experienced applicator who has completed painting system applications similar in material and extent to those indicated for the Project that have resulted in a construction record of successful in-service performance.

F. Single-Source Responsibility
1. Provide primers and undercoat paint produced by the same manufacturer as the finish coats.

G. Field Samples

1. On wall surfaces and other exterior and interior components, duplicate finishes of prepared samples. Provide full-coat finish samples on at least 100 sq. ft. of surface.

1.04 DELIVERY AND STORAGE

A. The Consultant/Engineer will select one surface to represent surfaces and conditions for each type of coating and substrate to be painted. Apply coatings in this room or surface according to the schedule or as specified.

B. Deliver materials to the job site in the manufacturer's original, unopened packages and containers bearing manufacturer's name and label with the product trade name manufacturer's instructions.

C. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F (7 deg C). Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily.

D. Project Conditions

1. Do not apply paint in snow, rain, fog, or mist, or when the relative humidity exceeds 85 percent, or at temperatures less than 5 deg F (3 deg C) above the dew point, or to damp or wet surfaces.

E. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 deg F (10 deg C) and 90 deg F (32 deg C).

F. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 deg F (7 deg C) and 95 deg F (35 deg C).

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Subject to compliance with requirements of the specification, products from the following manufacturers are acceptable:

1. Benjamin Moore, Aura Exterior Acrylic Latex Paint System
2. Pratt & Lambert, Pro-Hide Gold Exterior Acrylic Latex Paint System
3. Pittsburgh Paints, Manor Hall Exterior Acrylic Latex Paint System
4. Sherwin Williams, Duration Exterior Acrylic Latex Paint System
Painting

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions under which painting will be performed for compliance with requirements. Do not begin application until unsatisfactory conditions have been corrected.

B. Provide equipment and facilities for protection of workers from hazardous materials resulting from paint removal and surface preparation.

C. If, during the course of construction, the Contractor encounters materials that he believes may contain lead, notify the Consultant/Engineer immediately.

D. Coordination

1. Review other Sections in which primers are provided to ensure compatibility of the total systems for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

E. Notify the Architect about anticipated problems using the materials specified over substrates primed by others.

3.02 PREPARATION
A. Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted, or provide surface-applied protection prior to surface preparation and painting. Remove these items, if necessary, to completely paint the items and adjacent surfaces. Following completion of painting operations in each space or area, have items reinstalled by workers skilled in the trades involved.

B. Cleaning

1. Clean all existing and new substrates of substances that could impair the bond of the various coatings. Remove oil and grease prior to cleaning. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

C. Surface Preparation

1. Clean and prepare surfaces to be painted according to the manufacturer's instructions for each particular substrate condition and as specified.

D. Provide barrier coats over incompatible primers or remove and re-prime.

E. Wood

1. Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.

2. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer before applying primer.

F. Prime, stain, or seal wood to be painted immediately upon delivery. Prime edges, ends, faces, undersides, and backsides of wood.

G. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately upon delivery.

H. Ferrous Metals

1. Clean un-galvanized ferrous-metal surfaces that have not been shop-coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with recommendations of the Steel Structures Painting Council.

2. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents and touch up with the same primer as the shop coat.

I. Galvanized Surfaces

1. Clean galvanized surfaces with non-petroleum-based solvents so that the surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.
J. Materials Preparation

1. Carefully mix and prepare paint materials according to manufacturer's directions.

2. Stir material before application to produce a mixture of uniform density; stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.

3. Use only thinners approved by the paint manufacturer and only within recommended limits.

3.03 APPLICATION

A. General

1. Apply paint according to manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.

2. Provide finish coats that are compatible with primers used.

3. The number of coats and the film thickness required are the same regardless of the application method. Do not apply succeeding coats until previous coat has cured. Sand between applications where sanding is required to produce an even smooth surface.

4. Apply additional coats if undercoats, stains, or other conditions show through final coat of paint until paint film is of uniform finish, color, and appearance.

5. The term exposed surfaces includes areas visible when permanent or built-in fixtures are in place. Extend coatings in these areas to maintain system integrity and provide desired protection.

B. Scheduling Painting

1. Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable and before subsequent surface deterioration. Allow sufficient time between successive coats to permit proper drying. Do not recoat until paint has dried.

C. Application Procedures

1. Apply paints and coatings by brush or roller according to manufacturer's directions. Spray methods will not be accepted.

D. Brushes

1. Use brushes best suited for the material applied.

E. Rollers
1. Use rollers of carpet, velvet back, or high-pile sheep’s wool as recommended by the manufacturer for the material and texture required.

F. Minimum Coating Thickness

1. Apply materials at the manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.

G. Prime Coats

1. Before applying finish coats, apply a prime coat to material to be painted or finished that has not been prime-coated by others. Reccoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.

H. Completed Work

1. Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with specified requirements.

3.04 CLEANUP

A. At the end of each work day, remove empty cans, rags, rubbish, and other discarded paint materials from the site.

B. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces.

3.05 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.

B. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.

C. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

D. Paint Schedule

1. Provide the following paint coatings and thicknesses for the various substrates indicated:
SECTION 32 31 13

CHAIN LINK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:

1. Chain-link fences.

1.03 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Inspect and discuss electrical roughing-in, equipment bases, and other preparatory work specified elsewhere.
2. Review required testing, inspecting, and certifying procedures.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:

B. Shop Drawings: For each type of fence and gate assembly.

1. Include plans, elevations, sections, details, and attachments to other work.

C. Samples for Initial Selection: For each type of factory-applied finish.

D. Samples for Verification: For each type of component with factory-applied finish, prepared on Samples of size indicated below:

1. Polymer-Coated Components: In 6-inch (150-mm) lengths for components and on full-sized units for accessories.
E. Delegated-Design Submittal: For structural performance of chain-link fence and gate frameworks, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.05 INFORMATIONAL SUBMITTALS

A. Qualification Data: For professional engineer

B. Product Test Reports: For framework strength according to ASTM F1043, for tests performed by manufacturer and witnessed by a qualified testing agency

C. Sample Warranty: For special warranty.

1.06 QUALITY ASSURANCE

A. Mockups: Build mockups to set quality standards for fabrication and installation.

1. Build mockup for typical chain-link fence including accessories.

   a. Size: 10-foot (3 m) length of fence.

1.07 FIELD CONDITIONS

A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

1.08 WARRANTY

A. Special Warranty: Installer agrees to repair or replace components of chain-link fences and gates that fail in materials or workmanship within specified warranty period.

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

   a. Failure to comply with performance requirements.
   b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
   c. Faulty operation of gate operators and controls.

2. Warranty Period: Five years from date of Substantial Completion.
PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design chain-link fence and gate frameworks.

B. Structural Performance: Chain-link fence and gate frameworks shall withstand the design wind loads and stresses for fence height(s) and under exposure conditions indicated according to ASCE/SEI 7.

1. Design Wind Load: As indicated on Drawings.

2.02 CHAIN-LINK FENCE FABRIC

A. General: Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist according to "CLFMI Product Manual" and requirements indicated below:

1. Fabric Height: As indicated on Drawings.
2. Steel Wire for Fabric: Wire diameter of 0.148 inch (3.76 mm)
   a. Mesh Size: 2 inches (50 mm).
   b. Polymer-Coated Fabric: ASTM F668, Class 1 over Zn-5-Al-MM-alloy-coated steel wire.
      1) Colorblack, match existing adjacent, according to ASTM F934.
   c. Coat selvage ends of metallic-coated fabric before the weaving process with manufacturer's standard clear protective coating.
3. Selvage: Knuckled at both selvages.

2.03 TENSION WIRE

A. Polymer-Coated Steel Wire: 0.148-inch (3.8-mm-) diameter, tension wire according to ASTM F1664, Class 1 over Zn-5-Al-MM-alloy-coated steel wire.

1. Color: Black match existing adjacent according to ASTM F934.

2.04 FITTINGS

A. Tie Wires, Clips, and Fasteners: According to ASTM F626.

1. Standard Round Wire Ties: For attaching chain-link fabric to posts, rails, and frames, according to the following:
a. Hot-Dip Galvanized Steel: 0.148-inch- (3.76-mm-) diameter wire; galvanized coating thickness matching coating thickness of chain-link fence fabric.

B. Finish:

1. Metallic Coating for Pressed Steel or Cast Iron: Not less than 1.2 oz./sq. ft. (366 g/sq. m) of zinc.
   a. Polymer coating over metallic coating.

2.05 GROUNDING MATERIALS

A. Comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems."

B. Connectors and Grounding Rods: Listed and labeled for complying with UL 467.
   1. Connectors for Below-Grade Use: Exothermic welded type.
   2. Grounding Rods: Copper-clad steel, 5/8 by 96 inches (16 by 2440 mm).

PART 3 - EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

A. Layout locations of fence lines, (152 m). Indicate locations of utilities.

3.03 CHAIN-LINK FENCE INSTALLATION

A. Install chain-link fencing according to ASTM F567 and more stringent requirements specified.
   1. Install fencing on established lines.


C. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and existing framing, with tension bands spaced not more than 15 inches (380 mm) o.c.

D. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at one end to chain-link fabric, wrap wire around post a minimum of 180
degrees, and attach other end to chain-link fabric according to ASTM F626. Bend ends of wire to minimize hazard to individuals and clothing.

1. Maximum Spacing: Tie fabric to line posts at 12 inches (300 mm) o.c. and to braces at 24 inches (610 mm) o.c.

E. Fasteners: Install nuts for tension bands and carriage bolts on the side of fence opposite the fabric side. [Peen ends of bolts or score threads to prevent removal of nuts.]

3.04 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests.

B. Grounding Tests: Comply with requirements in Section 264113 "Lightning Protection for Structures."

C. Prepare test reports.

3.05 ADJUSTING

A. Adjust layout as needed to appear square and true.

3.06 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain chain-link fences and gates.

END OF SECTION 32 31 13