BID SPECIFICATIONS

26205

GIRARD HALL HVAC MODIFICATIONS - SYSTEMS 1 AND 2

NOTE: CONTRACTOR SHALL CONTACT THE UNIVERSITY TO PUT THE FIRE ALARM SYSTEM IN TEST MODE PRIOR TO ANY AND ALL CONSTRUCTION.

SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Work by Owner.
4. Access to site.
5. Coordination with occupants.
6. Work restrictions.
7. Specification and drawing conventions.
8. Miscellaneous provisions. B. Related Requirements:

B. Division 1 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

A. Project Identification: Girard Hall – HVAC Modifications (System 4 and 5), University of Louisiana at Lafayette.

1. Project Location: 110 East University Ave, Lafayette, Louisiana 70503.

2. Owner: University of Louisiana at Lafayette.

3. Owner's Representative: Scott Hebert, Director of Facility Management, Parker Hall Room 100, P.O. Box 43210, Lafayette, Louisiana 70504-3210, (337) 482-2001.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and includes HVAC Modifications at Girard Hall and consists of the following:

1. Demolition of existing HVAC systems and installation of new HVAC systems.
2. HVAC ductwork.
3. Electrical power, and data systems.

B. Type of Contract:

1. Project will be constructed under a single prime contract.
2. Contract Form: The Universities standard contract for construction.

1.5 WORK BY OWNER

A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.

B. Work by Owner: Owner will perform the following operations at Project site. Those operations are scheduled to be substantially complete before work under this Contract begins as follows:

1. The Owner shall remove any obstructions or items that interferes with construction.

1.6 SCHEDULE

A. General: The Contractor shall complete the construction within the scheduled time listed below. The Contractor's Project Schedule shall include the following non-negotiable milestone dates.

1. Contractor shall complete the Work within two hundred seventy (270) days of the Notice to Proceed.

1.7 ACCESS TO SITE

A. General: Contractor shall have limited use of Project site for construction operations as indicated by requirements of this Section.

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

1. Limits:

a. Storage and parking areas will be provided onsite. Coordinate exact location with Owner's representative.

2. Driveways, Walkways and Entrances: Keep driveways, parking loading areas**,** and entrances serving premises clear and available to Owner, Owner's employees, students, 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 by construction operations.
b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
c. Coordinate activities with Owner to avoid conflicts.

C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

1.8 COORDINATION WITH OCCUPANTS

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

1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
2. Notify Owner not less than seventy-two (72) hours in advance of activities that will affect Owner's operations.
3. Conduct operations that limit the use of the building and site to weekends and after business hours.

1.9 WORK RESTRICTIONS

THE EXISTING BUILDINGS ELEVATOR IS OFFLIMITS TO THE CONTRACTOR. CONTRACTOR SHALL USE THE EXISTING STAIRS ADJACENT TO THE PROJECT AREA FOR ACCESS.

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: (Unless the University agrees to other ours worked)

1. Limit work within the existing building to times when Girard Hall is open, including evening and night, and weekends or holidays.
2. Limit work that restricts the use of the building and site to early morning hours, after hours, or weekends.

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

1. Notify Owner’s representative not less than two (2) days in advance of proposed utility interruptions.
2. Obtain Owner's representative’s written permission before proceeding with utility interruptions.
3. As specifically indicated in the Contract Documents.

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

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

E. Nonsmoking Campus: Smoking is not permitted on University property.

F. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

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

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

2. Contractor shall not allow his own personnel or personnel of subcontractors, suppliers that are prohibited by law from entering school property to access the site.

1.10 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. General Requirements: Requirements apply to the Work of all Sections in the Specifications.

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

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PRE-CONSTRUCTION MEETING

A. A pre-construction meeting will be held at a time and place designated by the Owner, for the purpose of identifying responsibilities of the Owner's personnel and explanation of administrative procedures.

B. The Contractor shall also use this meeting for the following minimum agenda:

1. Construction Schedule.
2. Use of areas of the site.
3. Delivery and storage.
4. Safety.
5. Security.
6. Cleaning up.
7. Subcontractor procedures relating to:

a. Submittals.
b. Change Orders.

c. Applications for Payment.
d. Record Documents.

C. Attendees shall include:
1. The Owner.
2. The Contractor and its superintendent.
3. Major subcontractors, suppliers, and fabricators.
4. Others interested in the Work.

3.2 SECURITY PROCEDURES

A. Limit access to the site to persons involved in the Work.

B. Provide secure storage for materials for which the Owner has made payment, and which are stored on site.

C. Secure completed work as required to prevent loss.

3.3 COORDINATION

A. If necessary, inform each party involved, in writing, of procedures required for coordination; include requirements for giving notice, submitting reports, and attending meetings.

1. Inform the Owner when coordination of his work is required.

B. See other requirements in other portions of the Contract Documents.

END OF SECTION

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:

1. "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.3 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: No Substitutions for Convenience shall be allowed after bids are received. See “Instructions to Bidders”

1.4 ACTION SUBMITTALS

A. Substitution Requests: Submit three (3) copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use CSI Form 13.1A.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified product or fabrication, or installation cannot be provided, if applicable.
b. Coordination 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 substitution 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 and 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 substitution 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.

3. Owner's Action: If necessary, Owner will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Owner will notify Contractor of acceptance or rejection of proposed substitution within fifteen (15) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
b. Use product specified if Owner does not issue a decision on use of a proposed substitution within time allocated.

1.5 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.

1.6 PROCEDURES

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

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than fifteen (15) days prior to time required for preparation and review of related submittals.

1. Conditions: Owner will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Owner 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 is compatible with other portions of the Work.
    e. Requested substitution has been coordinated with other portions of the Work.
    f. Requested substitution provides specified warranty.
    g. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (Not Used)

END OF SECTION

CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

B. Related Requirements:

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

1.3 MINOR CHANGES IN THE WORK

A. Owner will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on form included in Project Manual.

1.4 PROPOSAL REQUESTS

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

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

    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include costs of labor and supervision directly attributable to the change.
    d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
    e. Quotation Form: Use forms acceptable to Owner.

1.5 CONTRACT MODIFICATION PROCEDURES

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

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

1.6 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Changes Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on form included in Project Manual.

1.7 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Owner may issue a Construction Change Directive on form included in Project Manual. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

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

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

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment. B. Related Requirements:

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

1.3 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's construction schedule. Cost-loaded Critical Path Method Schedule may serve to satisfy requirements for the Schedule of Values.

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

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

2. Submit the Schedule of Values to Owner at earliest possible date, but no later than seven (7) days before the date scheduled for submittal of initial Applications for Payment.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one (1) line item for each Specification Section.

1. Identification: Include the following Project identification on the Schedule of Values:

   a. Project name and location.
   b. Name of Architect.
   c. Date of submittal.

2. Arrange Schedule of Values consistent with format of AIA Document G703.
3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents.

Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.

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

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

6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown as separate line items in the schedule of values as general conditions expenses.

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

1.4 APPLICATIONS FOR PAYMENT

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

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

B. Payment Application Times: The date for each progress payment is indicated in the Supplemental Conditions. The period of construction work covered by each Application for Payment is the period indicated in the Supplemental Conditions.

C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.

D. Application Preparation: Complete every entry on form. Execute by a person authorized to sign legal documents on behalf of Contractor. Owner will return incomplete applications without action.

1. Entries shall match data on the Schedule of Values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored on site, but not yet installed. The Contractor may only request payment for materials stored on site.

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

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

F. Transmittal: Submit four (4) signed original copies of each Application for Payment to Owner by a method ensuring receipt. One (1) copy shall include waivers of lien and similar attachments if required.

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

G. Final Waivers of Mechanic's Lien: With the Application for Payment immediately following the expiration of the lien period prescribed by law, submit a Lien and Waver Certificate (Lien-Free Certificate) issued by the Clerk of Court of the Parish in which the Contract was recorded.

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

1. List of subcontractors.
2. Schedule of Values.
3. Contractor's construction schedule (preliminary if not final).
4. List of Contractor's staff assignments.
5. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
6. Report of preconstruction conference.
7. Certificates of Insurance and insurance policies.
8. Performance and Payment Bonds, if required.

I. Application for Payment at Substantial Completion: After Owner issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

J. Application for Payment of Retainage: The Contractor may make one (1) Application for Payment between Substantial Completion and the Final Application for Payment.

1. Upon expiration of the lien period prescribed by law and submission of a "Lien and Privilege Certificate" described above, the Contractor may submit an Application for Payment requesting payment of retainage.

2. Payment for sums withheld to complete the Work or held to complete items in the "Punchlist" will not be made until the Final Application for Payment and all items of Work have been satisfactorily completed.

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

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1. General coordination procedures.
2. Coordination drawings.
3. Requests for Information (RFIs).
4. Project meetings. B. Related Requirements:
5. "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
6. "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
7. "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

A. RFI: Request from Owner, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Use CSI Form 1.5A or other similar form approved by the Owner. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.
2. Scope of work covered by the subcontract or products, or equipment being provided by the supplier.

B. Key Personnel Names: Within fifteen (15) days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1. Post copies of list in Project Meeting Room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.5 GENERAL COORDINATION PROCEDURES

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

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair. Failure to properly coordinate the installation of multiple components shall be considered cause for rejection of installed work requiring the Contractor to remove and reinstall work in a properly coordinated manner.
3. Make adequate provisions to accommodate items scheduled for later installation.
4. For work conducted by public or private utilities required as part of the Work of this contract, the Contractor shall coordinate and pay for the Work. The Owner will make arrangements to allow the Contractor access to account information as necessary to complete the Work at the request of the Contractor.

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

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

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

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

1.6 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.

b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
f. Indicate required installation sequences.
g. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Owner indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

B. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
2. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
3. Mechanical and Plumbing Work: Show the following:

    a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
    b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
    c. Fire-rated enclosures around ductwork.

4. Electrical Work: Show the following:

    a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
    b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
    c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
    d. Location of pull boxes and junction boxes dimensioned from column center lines.

5. Fire-Protection System: Show the following:

    a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.

6. Review: Owner will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Owner determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Owner will so inform Contractor, who shall make changes as directed and resubmit.
7. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in "Submittal Procedures."

C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:

1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
2. File Preparation Format: DXF, Version 2014, operating in Microsoft Windows operating system.
3. File Submittal Format: Submit or post coordination drawing files using format same as file preparation format.
4. Owner will furnish Contractor digital data files of Drawings for use in preparing coordination digital data files upon request and in compliance with the conditions set below.

    a. Owner makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
    b. Data contained in these electronic files are part of the Owner's instruments of service and are subject to copyright protection. Use of the data contained in the files by the Contractor or anyone else receiving this data through or from the Contractor for any purpose other than as a source of information for this Project and shall be strictly prohibited.
    c. Contractor shall execute a data licensing agreement in the form of Agreement included in this Project Manual: Agreement for Single Use of Electronic (CAD) Media.

1.7 REQUESTS FOR INFORMATION (RFIs)

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

1. Owner will return RFIs submitted to Owner by other entities controlled by Contractor with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

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

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

C. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to Owner.

1. Attachments shall be electronic files in Adobe Acrobat PDF format.

D. Architect's Action: Owner will review each RFI, determine action required, and respond.
Allow seven (7) working days for Owner's response for each RFI. RFIs received by Owner after 1:00 p.m. will be considered as received the following working day.

1. The following Contractor-generated RFIs will be returned without action:

a. Requests for approval of submittals.
b. Requests for approval of substitutions.
c. Requests for approval of Contractor's means and methods.
d. Requests for coordination information already indicated in the Contract Documents.
e. Requests for adjustments in the Contract Time or the Contract Sum.
f. Requests for interpretation of Architect's actions on submittals.
g. Incomplete RFIs or inaccurately prepared RFIs.

2. Owner's action may include a request for additional information, in which case Owner's time for response will date from time of receipt of additional information.
3. Owner's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to "Contract Modification Procedures."

a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within ten (10) days of receipt of the RFI response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Software log with not less than the following:
1. Project name.
2. Name and address of Contractor.
3. Name and address of Owner.
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect’s response was received.

F. On receipt of Owner's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Owner within seven (7) days if Contractor disagrees with response.

1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

1.8 PROJECT MEETINGS

A. General: Coordinate with Owner to schedule and conduct meetings and conferences at Project site unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify representatives of all sub-contractors to attend meeting who are currently providing work are or scheduled to provide work within thirty (30) days of the scheduled meeting.
2. Agenda: The Owner will prepare a standard meeting agenda form and distribute a draft of said form to the Owner and Contractor to allow for additional information to be added to the agenda form if necessary. This form shall help to facilitate required information to be presented at the monthly meetings.

B. Preconstruction Conference: Owner will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Owner, but no later than fifteen (15) days after execution of the Agreement.

1. Conduct the conference to review responsibilities and personnel assignments.
2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Owner; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect progress, including the following:

    a. Review of required pre-construction conference submittals: Ref: Supplementary Conditions 7.1.4
    b. Tentative construction schedule.
    c. Phasing.
    d. Critical work sequencing and long-lead items.
    e. Designation of key personnel and their duties.
    f. Lines of communications.
    g. Procedures for processing field decisions and Change Orders.
    h. Procedures for RFIs.
    i. Procedures for testing and inspecting.
    j. Procedures for processing Applications for Payment.
    k. Distribution of the Contract Documents.
    l. Submittal procedures.
    m. Preparation of record documents.
    n. Work restrictions.
    o. Working hours.
    p. Owner's occupancy requirements.
    q. Responsibility for temporary facilities and controls.
    r. Procedures for disruptions and shutdowns.
    s. Construction waste management and recycling.
    t. Parking availability.
    u. Progress cleaning.

C. Pre-installation Conferences: Conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Owner and Owner's Commissioning Authority of scheduled meeting dates.

2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

    a. Contract Documents.
    b. Options.
    c. Related RFIs.
    d. Related Change Orders.
    e. Submittals.
    f. Review of mockups.
    g. Possible conflicts.
    h. Compatibility requirements.
    i. Time schedules.
    j. Manufacturer's written instructions.
    k. Coordination with other work.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Owner shall distribute minutes of the meeting to each party present.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner, but no later than 60 days prior to the scheduled date of Substantial Completion.

1. Conduct the conference to review requirements and responsibilities related to Project closeout.
2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Owner; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:

    a. Preparation of record documents.
    b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
    c. Submittal of written warranties.
    d. Requirements for preparing operations and maintenance data.
    e. Requirements for delivery of material samples, attic stock, and spare parts.
    f. Requirements for demonstration and training.
    g. Preparation of Contractor's punch list.
    h. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
    i. Submittal procedures.
    j. Owner's partial occupancy requirements.
    k. Installation of Owner's furniture, fixtures, and equipment.
    l. Responsibility for removing temporary facilities and controls.

4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

E. Progress Meetings: Conduct progress meetings at monthly intervals.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner, Owner's Commissioning Authority, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Contractor shall provide a monthly report to be presented to Owner at the meetings.
4. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

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

        1) Review schedule for next period.

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

        1) Sequence of operations.
        2) Status of submittals.
        3) Access.
        4) Site utilization.
        5) Temporary facilities and controls.
        6) Progress cleaning.
        7) Quality and work standards.
        8) Status of correction of deficient items.
        9) Field observations.
        10) Status of RFIs.
        11) Status of proposal requests.
        12) Pending changes.
        13) Status of Change Orders.
        14) Pending claims and disputes.
        15) Documentation of information for payment requests.
        16) Adverse weather claims: Ref: Supplementary Conditions Article

5. Minutes: Owner shall record and distribute the meeting minutes to each party present.

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

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

B. Related Requirements:

1. "Submittal Procedures" for submitting schedules and reports.
2. "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 INFORMATIONAL SUBMITTALS

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

1. PDF electronic file.
2. Two (2) paper copies.

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

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

D. Daily Construction Reports: Submit at weekly intervals.

E. Material Location Reports: Submit at monthly intervals.

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

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

1.4 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

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

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

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.

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

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

1. Activity Duration: Define activities so no activity is longer than twenty (20) days, unless specifically allowed by Architect.
2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than sixty (60) days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
3. Submittal Review Time: Include review and resubmittal times indicated in "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
4. Startup and Testing Time: Include no fewer than fifteen (15) days for startup and testing.
5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion and allow time for Owner's administrative procedures necessary for certification of Substantial Completion.
6. Punch List and Final Completion: Include not more than forty-five (45) days for completion of punch list items and final completion.

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

1. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
2. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
3. Work Restrictions: Show the effect of the following items on the schedule:

    a. Use of premises restrictions.
    b. Provisions for future construction.
    c. Environmental control.

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

    a. Periods when access will be limited by construction activities.
    b. Partial occupancy or Substantial Completion
    c. Substantial Completion.

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

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

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

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-charttype, Contractor's construction schedule within thirty (30) days of date established for the Notice to Proceed. Base schedule on the startup construction schedule and additional information received since the start of Project.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

1. For construction activities that require three (3) months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

2.3 REPORTS

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

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Material deliveries.
5. High and low temperatures and general weather conditions, including presence of rain.
6. Accidents.
7. Meetings and significant decisions.
8. Unusual events (see special reports).
9. Stoppages, delays, shortages, and losses.

10. Orders and requests of authorities having jurisdiction.
11. Construction Change Directives received and implemented.
12. Services connected and disconnected.

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

2.4 SPECIAL REPORTS

A. General: Submit special reports directly to Owner within one (1) day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one (1) week before each regularly scheduled progress meeting.

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

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

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

END OF SECTION

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

B. The Owner's review of submittals is defined in the General and Supplementary Conditions of the Contract and is for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents and does not relieve the Contractor from compliance with the requirements of the Contract Documents. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, all of which remain the responsibility of the Contractor. C. Related Requirements:

1. "Payment Procedures" for submitting Applications for Payment and the Schedule of Values.
2. "Substitution Procedures" for submitting products or materials for substitution.
3. "Project Management and Coordination" for submitting Coordination Documents and the use of the Architects digital files.
4. "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
5. "Operation and Maintenance Data" for submitting operation and maintenance manuals.
6. "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Owner’s responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

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

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

1.4 SUBSTITUTIONS

A. Submittal of products or materials that have not been approved for use in the Work are to be submitted under "Substitution Procedures" and will not be reviewed as submittals.

1.5 ACTION SUBMITTALS

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

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

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

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

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

1.6 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Owner will furnish Contractor digital data files of Drawings for use in preparing Shop Drawings and Project Record Drawings upon request and in compliance with the conditions set below.

1. Owner makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
2. Data contained in these electronic files are part of the Owner's instruments of service and are subject to copyright protection. Use of the data contained in the files by the Contractor or anyone else receiving this data through or from the Contractor for any purpose other than as a source of information for this Project and shall be strictly prohibited.

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

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.

    a. Where items specified in a specification section are provided by different suppliers, submittals may be separate submittals reflecting the division of responsibility.

3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

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

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

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

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

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

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

        1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential letter and number (e.g., 061000. A1 for the first submittal). Different materials in the same section will have different letter designations (061000.A1, 061000.B1). Resubmittals shall

add to the number (e.g., 061000.A2, 061000.B2 as the second submittal of the "A" or "B" material).

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

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

a. Submit one (1) copy of submittal to concurrent reviewer in addition to specified number of copies to Owner.

5. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Owner will return without review submittals received from sources other than Contractor.

a. Transmittal Form for Paper Submittals: Use AIA Document G810 or other submittal form acceptable to the Owner.

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

1. Assemble complete submittal package into a single file incorporating submittal requirements and transmittal form.
2. Name file with submittal number or other unique identifier, including revision identifier.

a. File name shall use project identifier and Submittal number as described above (e.g., LNHS-061000.A1).

3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Owner.
4. Transmittal Form for Electronic Submittals: Use electronic form containing information required for paper submittals described above.

F. Options: Identify options requiring selection by Owner.

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

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

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Owner’s action stamp.

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

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

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

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

1. Submit electronic copies of all submittals via email as PDF electronic files. Paper copies may be required in addition to electronic files as required in individual sections.

    a. Owner will return annotated file. Annotate and retain one (1) copy of file as an electronic Project record document file.

2. Action Submittals: Submit one (1) electronic copy. Provide two (2) paper copies when required by individual sections.

    a. Owner will return an annotated copy of the electronic file to the Contractor.

3. Informational Submittals: Submit one (1) electronic copy.

    a. Owner will NOT return copies of informational submittals.

4. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

    a. Provide a notarized statement on original paper copy certificates and certifications where indicated.

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

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which specific 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 or highlight applicable standards in manufacturer's standard product cut sheets.
    e. Testing by recognized testing agency.
    f. Notation of coordination requirements.

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

    a. Operational range diagrams.

b. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

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

   a. PDF electronic file.

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

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

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

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 24 by 36 inches.
3. Submit Shop Drawings in the following format:

   a. PDF electronic file.
   b. If paper copies are required in individual sections, provide two (2) opaque (bond) copies of each submittal. Architect will return an annotated electronic copy of the submittal. Paper copies will not be returned.

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

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

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

3. In addition to the physical samples and paper copies of the transmittal, provide electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

a. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

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

a. Number of Samples: Submit three (3) full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Owner will return two (2) of the submittal copies with options selected for the Contractor and manufacturer.

E. Coordination Drawing Submittals: Comply with requirements specified in "Project Management and Coordination."

F. Contractor's Construction Schedule: Comply with requirements specified in "Construction Progress Documentation."

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

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

I. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in "Closeout Procedures."

J. Maintenance Data: Comply with requirements specified in "Operation and Maintenance Data."

2.2 DELEGATED-DESIGN SERVICES

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

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

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

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

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

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

1. Submittals that have not been reviewed and approved by the Contractor prior to submittal to the Owner will be returned without action by the Owner.

B. Project Closeout and Maintenance Material Submittals: See requirements in "Operation and Maintenance Data".

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

3.2 OWNER'S ACTION

A. Action Submittals: Owner will review each submittal, make marks to indicate corrections or revisions required, and return it. Owner will indicate action on the transmittal or stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.

1. Approved: No exceptions have been taken and the Contractor may proceed.
2. Approved as Noted: The Contractor shall make the corrections noted and may proceed without resubmitting the submittal.
3. Not Approved - Revise and Resubmit: The Contractor shall make necessary corrections and resubmit the submittal for approval. The Contractor is not authorized to proceed.
4. Submit Revised Copy: The Contractor shall provide a revised copy of a submittal that has been "Approved as Noted". This copy will be for information purposes only.

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

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

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

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

END OF SECTION

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

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

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

1.3 DEFINITIONS

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

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

C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

D. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

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

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

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

H. 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).

1.4 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two (2) 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 Owner for a decision before proceeding.

B. Conflicts within the Contract Documents: If the Contract Documents require different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent, more costly or more restrictive requirement. Refer conflicting requirements to Owner for a decision before proceeding.

C. 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 Owner for a decision before proceeding.

1.5 CONTRACTOR'S QUALITY-CONTROL PLAN

A. Quality-Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.

1. Project Quality-Control Manager may also serve as Project Manager for the Project.

B. Continuous Inspection of Workmanship: Provide continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.

C. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Owner has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.6 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 re-inspecting.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

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

1.7 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 products that are similar in material, design, and extent to those indicated for this Project.

F. 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.

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

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

1.8 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 re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

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

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

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

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

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

D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in pre-installation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

E. Retesting/Re-inspecting: 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.

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. Preliminary design mix proposed for use for material mixes that require control by testing agency.
6. 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.

1.9 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections, 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 Owner, Commissioning Authority, 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 Owner and Commissioning Authority 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 re-inspecting 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 Owner.
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 Owner's, Commissioning Authority'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 "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

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

B. Related Requirements:

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

1.3 USE CHARGES

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

B. Electric Power Service Contractor may use Building’s electrical power.

C. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.4 INFORMATIONAL SUBMITTALS

A. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire prevention program.

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

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

1.5 QUALITY ASSURANCE

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

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

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

1.6 PROJECT CONDITIONS

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

PART 2 - PRODUCTS

2.1 MATERIALS

A. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches.

2.2 EQUIPMENT

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

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction and marked for intended location and application.
3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction and clean HVAC system as required in "Closeout Procedures"

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

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

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

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

3.2 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide construction for temporary facilities as directed by Owner's Representative.
2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

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

1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
2. Prepare subgrade and install sub-base and base for temporary roads and paved areas according to "Earth Moving."

C. Parking: As indicated on architectural site plan.

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

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

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

1. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.

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

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

F. Waste Disposal Facilities: Comply with requirements specified in "Construction Waste Management and Disposal."

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

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

3.3 SECURITY AND PROTECTION FACILITIES INSTALLATION

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

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

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

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

3.4 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.

1. If windows are removed to allow for disposal of waste materials or delivery of building materials, provide measures to limit moisture intrusion into the buildings and/or removal of moisture after opening has been closed.

3.5 OPERATION, TERMINATION, AND REMOVAL

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

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

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

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

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

END OF SECTION

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1. "Substitution Procedures" for requests for substitutions.

1.3 DEFINITIONS

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

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

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. 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.
2. 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.
3. 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 materials in a manner that will not endanger Project structure.
2. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
3. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
4. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
5. 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. a. Where manufacturer's standard warranty is in conflict with the requirements of the Contract Documents, the manufacturer shall provide necessary endorsements or special provisions to cover the requirements of the Contract Documents as a Special Warranty.

2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

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

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

C. Submittal Time: Comply with requirements in "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," Owner will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

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

PART 3 - EXECUTION (Not Used)

END OF SECTION

EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 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. Cutting and patching.
4. Coordination of Owner-installed products.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.

B. Related Requirements:

1. "Summary" for limits on use of Project site.
2. "Submittal Procedures" for submitting surveys.
3. "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
4. "Penetration Firestopping" for patching penetrations in fire-rated construction.

1.3 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 INFORMATIONAL SUBMITTALS

1.5 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Owner before proceeding. Shore, brace, and support

structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.

2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that result in increased maintenance or decreased operational life or safety.

    a. Primary operational systems and equipment.
    b. Fire separation assemblies.
    c. Air or smoke barriers.
    d. Mechanical systems piping and ducts.
    e. Control systems.
    f. Communication systems.
    g. Fire-detection and -alarm systems.
    h. Electrical wiring systems.

3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that result in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
    a. Water, moisture, or vapor barriers.
    b. Membranes and flashings.
    c. Exterior windows.
    d. Piping, ductwork, vessels, and equipment.

4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Owner's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

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

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Owner for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. 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.

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

3.2 PREPARATION

A. 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.

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

C. 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 "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 Owner promptly.

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.
4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces unless indicated otherwise.

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 Owner.
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 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in "Summary."

F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.

2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

    a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    b. Restore damaged pipe covering to its original condition.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

    a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.

5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.6 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction personnel.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend pre-installation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.7 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 (3) 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.

   a. Use containers intended for holding waste materials of type to be stored.
4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

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. Comply with waste disposal requirements in "Temporary Facilities and Controls."

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.

3.8 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

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Disposing of nonhazardous construction waste.

1.3 DEFINITIONS

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

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

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

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

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

MANAGEMENT AND DISPOSAL

PART 1 – GENERAL (Not Used)

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 IMPLEMENTATION

A. General: Provide handling, containers, storage, signage, transportation, and other items as required for waste collection and removal during the entire duration of the Contract.

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

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

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

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

3.2 DISPOSAL OF WASTE

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

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

B. Burning: Do not burn waste materials.

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

D. THE USE OF UNIVERSITY’S DUMPSTERS IS PROHIBITED.

END OF SECTION

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

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

B. Related Requirements:

1. "Execution" for progress cleaning of Project site.
2. "Operation and Maintenance Data" for operation and maintenance manual requirements.
3. "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.3 ACTION SUBMITTALS

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

B. Certified List of Completed Punchlist Items: Final submittal at Final Completion.

1.4 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

1. Lien and Privilege Certificate (Lien-free Certificate).

B. Certificate of Insurance: For continuing coverage.

1.5 MAINTENANCE MATERIAL SUBMITTALS

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

1.6 SUBSTANTIAL COMPLETION PROCEDURES

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

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

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Sections, including project record documents, operation and maintenance manuals, final completion construction, damage or settlement surveys, property surveys, Elevation Certificate and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Owner. Label with manufacturer's name and model number where applicable.

    a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Architect's signature for receipt of submittals.

5. Submit test/adjust/balance records.
6. Submit information related to Owner's occupancy, use, operation, and maintenance.

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

1. Advise Owner of pending insurance changeover requirements.
2. Deliver permanent locks and key blanks to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified individual specification sections.
6. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
7. Complete final cleaning requirements, including touchup painting.
8. Touch up and repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of ten (10) days prior to date the work will be completed and ready for final

inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Owner 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 Owner, that must be completed or corrected before certificate will be issued.

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

1.7 FINAL COMPLETION PROCEDURES

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

1. Submit final Application for Payment according to "Payment Procedures."
2. List of Incomplete Items: Submit certified copy of Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization 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, starting with exterior areas first and proceeding from lowest floor to highest floor.
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 Owner.
    d. Name of Contractor.
    e. Page number.

4. Submit list of incomplete items in the following format:

    a. PDF electronic file. Owner will return annotated file.
    b. Three paper copies. Owner will return two (2) copies.

1.9 SUBMITTAL OF PROJECT WARRANTIES

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

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

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

1. Bind warranties and bonds in heavy-duty, three-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.
4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

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

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

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

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
   a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
   b. Rake grounds that are neither planted nor paved to a smooth, eventextured surface.
   c. Remove tools, construction equipment, machinery, and surplus material from Project site.
   d. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition.

e. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
f. Sweep concrete floors broom clean in unoccupied spaces.
g. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
h. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
i. Remove labels that are not permanent.
j. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
k. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
l. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
m. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
    1) Clean HVAC system in compliance with NADCA Standard 199201. Provide written report on completion of cleaning.
n. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
o. Leave Project clean and ready for occupancy.

C. Construction Waste Disposal: Comply with waste disposal requirements in "Construction Waste Management and Disposal."

3.2 REPAIR OF THE WORK

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

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

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

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

END OF SECTION

OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

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

B. Related Requirements:

1. "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

1.3 DEFINITIONS

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

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

1.4 CLOSEOUT SUBMITTALS

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

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

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

1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.
   a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
   b. Enable inserted reviewer Comments on draft submittals.

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

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

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

1. Correct or revise each manual to comply with Owner's comments. Submit copies of each corrected manual within fifteen (15) days of receipt of Owner's comments and prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

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

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

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

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

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

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

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

1. Title page.
2. Table of contents.

3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Owner.
7. Names and contact information for major consultants to the Owner that designed the systems contained in the manuals.

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

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

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one (1) system into a single binder.

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

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

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

1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2 by 11 inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
   a. If two (2) or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
   b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, subject matter of contents. Indicate volume number for multiple-volume sets.

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

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

2.3 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.
11. Product name and model number. Use designations for products indicated on Contract Documents.
12. Manufacturer's name.
13. Equipment identification with serial number of each component.
14. Equipment function.
15. Operating characteristics.
16. Limiting conditions.
17. Performance curves.
18. Engineering data and tests.
19. Complete nomenclature and number of replacement parts.

B. Descriptions: Include the following:

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.

6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed and identify color-coding where required for identification.

2.4 PRODUCT MAINTENANCE MANUALS

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

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

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

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

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

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

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

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

1. Include procedures to follow and required notifications for warranty claims.
2. Include original warranties as required in "Closeout Procedures".

2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and

service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

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

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

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

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

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

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

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

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

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

1. Include procedures to follow and required notifications for warranty claims.
2. Include original warranties as required in "Closeout Procedures".

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

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

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

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

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

D. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one (1) item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

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

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

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

F. Comply with "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1. Record Drawings.

B. Related Requirements:

1. "Execution" for final property survey.
2. "Closeout Procedures" for general closeout procedures.
3. "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

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

a. Final Submittal:

1) Submit one (1) paper-copy set(s) of marked-up record prints (Contractor's "Redline" set).
2) Submit PDF electronic files of scanned record prints.

B. Record Submittals: Submit one (1) paper copy and a PDF electronic file of all submittals required by "Submittal Procedures".

C. The Owner will prepare Record Documents from the Contractor’s mark-ups.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

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

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

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

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

    a. Dimensional changes to Drawings.
    b. Revisions to details shown on Drawings.
    c. Depths of foundations below first floor.
    d. Locations and depths of underground utilities.
    e. Revisions to routing of piping and conduits.
    f. Revisions to electrical circuitry.
    g. Actual equipment locations.
    h. Duct size and routing.
    i. Locations of concealed internal utilities.
    j. Changes made by Change Order or Construction Change Directive.
    k. Changes made following Owner's written orders.
    l. Details not on the original Contract Drawings.
    m. Field records for variable and concealed conditions.
    n. Record information on the Work that is shown only schematically.

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

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

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

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

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one (1) 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

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Cutting, demolition and removal of existing partitions to allow for installation of new construction.

B. Related Requirements:

1. "Summary" for restrictions on the use of the premises, Owner occupancy requirements, and phasing requirements.

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 Owner.

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. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

1. Before selective demolition, Owner will remove the following items:

a. Furniture, furnishings, and equipment.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. Hazardous materials will be removed by Owner before start of the Work.
2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities and protect them against damage during selective demolition operations.

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 Owner. Owner 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 Owner.

E. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.

1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. 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.

1. Arrange to shut off indicated utilities with utility companies.
2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
3. Disconnect, demolish, and remove plumbing, and HVAC systems, equipment, and components indicated to be removed.

    a. Piping to be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    b. Piping to be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
    c. Equipment to be Removed: Disconnect and cap services and remove equipment.

3.3 PREPARATION

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

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of the facility.
2. Protect walls, and other existing finish work that are to remain or that are exposed during selective demolition operations.

B. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

3.4 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 and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools

designed for sawing or grinding, not hammering, and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.

3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire suppression devices during flame-cutting operations.
5. Maintain adequate ventilation when using cutting torches.
6. Remove structural framing members and lower to ground by method suitable to avoid free fall.
7. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
8. Dispose of demolished items and materials promptly.

B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Owner, 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.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, then remove concrete between saw cuts.

B. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings."

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

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

3.7 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

PENETRATION FIREPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes through-penetration firestop systems for penetrations through the following fire resistance-rated assemblies, including both empty openings and openings containing penetrating items:

1. Walls and partitions.

B. Related Sections include the following:

1. Sections specifying cable and conduit penetrations.

1.2 PERFORMANCE REQUIREMENTS

A. General: For the following constructions, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.

1. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.

B. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, as determined per ASTM E 814, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.

C. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with Tratings indicated, as well as F-ratings, as determined per ASTM E 814, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:

1. Penetrations located outside wall cavities.
2. Penetrations located outside fire-resistive shaft enclosures.
3. Penetrations located in construction containing fire-protection-rated openings.
4. Penetrating items larger than 4 inch (100 mm) diameter nominal pipe or 16 sq. in. (100 sq. cm) in overall cross-sectional area.

D. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.

1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture resistant through-penetration firestop systems.
2. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

E. For through-penetration firestop systems exposed to view, provide products with flame-spread ratings of less than 25 and smoke-developed ratings of less than 450, as determined per ASTM E 84.

1.3 SUBMITTALS

A. Product Data: For each type of through-penetration firestop system product indicated.

B. Shop Drawings: For each through-penetration firestop system, show each kind of construction condition penetrated, relationships to adjoining construction, and kind of penetrating item. Include firestop design designation of testing and inspecting agency acceptable to authorities having jurisdiction that evidences compliance with requirements for each condition indicated.

1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
2. Where Project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire protection engineer.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed through-penetration firestop systems similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Installer Qualifications: An experienced installer who is qualified by having the necessary experience, staff, and training to install manufacturer's products per specified requirements. A manufacturer's willingness to sell its through-penetration firestop system products to Contractor or to an installer engaged by Contractor does not in itself confer qualification on buyer.

C. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, from a single manufacturer.

D. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in "Performance Requirements" Article:

1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
2. Through-penetration firestop systems are identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements:

a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
b. Through-penetration firestop systems correspond to those indicated by reference to through penetration firestop system designations listed by the following:

1) UL in "Fire Resistance Directory."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multi-component materials.

B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufactures offering accessories that may be incorporated into the Work include, but are not limited to, the following:

1. Hilti, Inc., Tulsa, Oklahoma (800) 879-8000
2. Tremco Sealants & Coatings, Beachwood, Ohio (216) 292-5000
3. 3M Fire Protection Products, St. Paul, Minnesota (612) 736-0203

2.2 FIRESTOPPING, GENERAL

Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through penetration firestop system manufacturer based on testing and field experience.

A. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:

1. Permanent forming/damming/backing materials, including the following:

   a. Slag-/rock-wool-fiber insulation.
   b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
   c. Fire-rated form board.

2. Temporary forming materials.

3. Substrate primers.
4. Collars.
5. Steel sleeves.

2.3 MIXING

A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with written recommendations of firestop system manufacturer and the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

A. General: Install through-penetration firestop systems to comply with "Performance Requirements" Article and firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.

C. Install fill materials for firestop systems by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Identify through-penetration firestop systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of edge of the firestop systems so that labels will be visible to anyone seeking to remove penetrating items or firestop systems. Use mechanical fasteners for metal labels. For plastic labels, use self-adhering type with adhesives capable of permanently bonding labels to surfaces on which labels are placed and, in combination with label material, will result in partial destruction of label if removal is attempted. Include the following information on labels:

1. The words "Warning - Through-Penetration Firestop System - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Through-penetration firestop system designation of applicable testing and inspecting agency.
4. Date of installation.
5. Through-penetration firestop system manufacturer's name.
6. Installer's name.

3.5 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure through penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.

END OF SECTION

ACOUSTICAL TILE CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exposed suspension system.
2. Trim and accessories.
3. Acoustical lay-in panels.
4. Exposed edge trim

B. Related Sections:

1. Heating and ventilating: Division 23.

1.2 DEFINITIONS

A. NRC (Noise Reduction Coefficient): The weighted average sound absorption coefficient of the ceiling materials when tested in accordance with ASTM C 423, with mounting No. E-400 (ASTM E 795).

B. CSTC (Ceiling Sound Transmission Class): The numerical rating of sound attenuation for the ceiling system between two (2) rooms when installed over a barrier with a common plenum above and tested in accordance with AMA-1-II-1967. C. LR (Light Reflectance Coefficient): As determined by ASTM E 1264.

1.3 SUBMITTALS

A. Product Data: Submit data for each distinct suspension system and acoustical unit type indicated.

B. Samples: Submit the following:

1. Verification samples:

a. Acoustical Units: 12 inch square samples of each type required.
b. Exposed suspension and trim elements: 12 inch long samples of each type and finish required.

1.4 QUALITY ASSURANCE

A. Fire Performance Characteristics:

1. Surface burning characteristics: Provide products having the following characteristics when tested in accordance with ASTM E 84:
   a. Maximum flame spread: Twenty-five (25).

1.5 PROJECT CONDITIONS

A. In a timely manner, furnish to affected installers, attachment devices for incorporation into other work.

B. Coordination Data: Prepare and distribute to affected installers, data necessary for coordination with related work. Include setting diagrams showing placement of attachment devices for acoustical ceiling hangers.

C. Coordinate ceiling system installation with work of other sections as required, including the following:

1. Light fixtures.
2. HVAC equipment.
3. Partitions.
4. Fire sprinkler system.

D. Within each space to receive specified products, do not begin installation until the following conditions are met:

1. Work above ceilings has been finished, tested, and approved.
2. Space to receive ceiling system is properly enclosed and protected from weather.
3. Any wet work within the space is dry.

E. Do not begin installation of ceiling system until building's normal operating temperature and humidity levels have been reached and will be maintained for duration of project.

1.6 MAINTENANCE

A. Extra Materials: After ceiling installation has been completed, deliver to the owner replacement materials for materials installed. Furnish products which precisely match installed products. Protect with appropriate packaging and provide clear, legible labels.

1. Acoustical lay-in panels: Furnish full-sized panels in quantities not less than 2 percent of quantity of panels installed.

PART 2 - PRODUCTS

2.1 ACOUSTICAL CEILING UNITS - GENERAL

A. Standard for Acoustical Ceiling Units: Provide units conforming to applicable requirements of

ASTM E 1264 for Class A materials.

B. Manufacturers: Products indicated by Armstrong.

2.2 CEILING SUSPENSION SYSTEMS - GENERAL

A. Provide suspension systems conforming to specified requirements and to requirements of ASTM C 635.

B. Manufacturers: Products indicated by Armstrong.

C. Colors: Provide indicated colors. Where color is not indicated, provide colors as selected by the architect from manufacturer's complete set of standard colors.

1. Finishes: Manufacturer's standard shop-applied finishes.

D. Attachment Devices for Suspension System:

1. Anchors and intermediate support members: Provide sizes capable of sustaining five (5) times the load-carrying capabilities shown in ASTM C 635, Table 1, "Direct Hung" column.
2. Hanger wire: Zinc-coated (galvanized) carbon steel wire, ASTM A 641, soft temper, with Class 1 coating, minimum 12 gauge (0.106 inch diameter).

E. Edge Moldings and Trim:

1. Extruded plastic or metal; provide indicated profiles. Where profiles are not indicated, provide molding with profiles suited to edge profiles of acoustical units and suspension members.

2.3 ACOUSTICAL PANEL CEILING SYSTEM (ACT-1)

A. Acoustical Panels: Armstrong “Cirrus”, “Tegular”.

1. ASTM E1264 Classification: Type III, Form 1, Pattern E1.
2. Edges: Beveled tegular lay-in.
3. Size: 24 by 24 inches.
4. Material: Mineral fiber.
5. NRC: 0.70.
6. CAC: 35.
7. Fire Class: Class A.
8. Fire Performance UL 723 (ASTM E 84) Flame Spread / Smoke Developed: 25 or less.
9. Fire Performance CAN ULC S102 Flame Spread / Smoke Developed: 50 or less.
10. Light Reflectance: 0.86.
11. R Value (BTU Units): 1.9.
12. RSI Value (Watts Units): 0.33.

B. Suspension System Components: Armstrong, Suprafine ML, 9/16 inch exposed.

1. Narrow-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; pre-painted, electrolytically zinc coated, or hot-dip galvanized, G30 (Z90) coating designation; with prefinished 9/16 inch (15 mm) wide metal caps on flanges.

a. Structural Classification: Heavy-duty system.
b. End Condition of Cross Runners: Override stepped or butt-edge type.
c. Face Design: Flanges formed with an integral center reveal.
d. Cap Material: Cold-rolled steel.
e. Cap Finish: Painted white.

2.4 ACOUSTICAL PANEL CEILING SYSTEM (ACT-2)

A. Acoustical Panels: Armstrong “Cirrus”, “Tegular”.

1. ASTM E1264 Classification: Type III, Form 1, Pattern E1.
2. Edges: Beveled tegular lay-in.
3. Size: 24 by 24 inches and 24 by 6 inches.
4. Material: Mineral fiber.
5. NRC: 0.70.
6. CAC: 35.
7. Fire Class: Class A.
8. Fire Performance UL 723 (ASTM E 84) Flame Spread / Smoke Developed: 25 or less.
9. Fire Performance CAN ULC S102 Flame Spread / Smoke Developed: 50 or less.
10. Light Reflectance: 0.86.
11. R Value (BTU Units): 1.9.
12. RSI Value (Watts Units): 0.33.

PART 3- EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions under which products of this section are to be installed and verify that the work properly may commence.

B. Verify that products furnished as work of this section, but not installed under this section, have been properly installed by the entity performing the installation.

3.2 PREPARATION

A. Layout:

1. Position ceiling components to maximize use of full-sized acoustical units and to provide border units which are equal in size and shape at opposing ceiling edges. Use of acoustical units which are smaller than 1/2 full-width is prohibited at ceiling perimeters. Conform to reflected ceiling plans to greatest extent possible.
2. Arrange components to allow for installation of lights and mechanical grilles in patterns indicated.

3.3 SUSPENSION SYSTEM INSTALLATION

A. General:

1. Conform to the requirements of ASTM C 636, manufacturer's installation instructions, and governing regulations.
2. Install hangers plumb and supported solely by building structure or carrying channels. Do not allow hangers to contact any objects or materials in ceiling plenum which are not actual components of ceiling system.

a. Splay hangers only where necessary to avoid obstacles. Provide counter-splaying, bracing, or other acceptable devices to compensate for lateral stresses caused by splayed hangers.
b. Do not attach hangers to piping, conduit, or duct. Provide carrying channel trapeze support where obstruction cannot be avoided by splaying hanger 45 degrees from vertical or less.

3. Space hangers at not more than 48 inches on center and within 6 inches of ends of each direct-hung runner or carrying channel, unless indicated otherwise.
4. Loop and tie wire hangers securely to building's structural members; to attachment devices indicated; or, where not indicated, to devices suitable for substrate and capable of permanently supporting ceiling weight without failure or deterioration.
5. Level ceiling suspension system to tolerance of 1/8 inch in 12 feet, with cumulative tolerance not to exceed 1/4 inch. Bending or kinking of hangers is not allowed.

B. Do not support equipment fixtures, etc. on ceiling grid, support from structure independent of grid.

C. Exposed (Lay-in) Grid Installation: Install grid members square, with ends of members securely interlocked. Remove and replace dented, bent, or kinked members.

3.4 TRIM INSTALLATION

A. Install edge moldings and trim units at acoustical ceiling borders, at locations indicated, and where required to cover acoustical unit edges.

1. Molding and trim attachment: Space screws not more than 16 inches on center and within 3 inches of ends of each trim-piece being installed. Install moldings and trim level with suspension system and within tolerance specified for suspension system.
2. Miter corners and align butt joints carefully to form tight hairline joints.

B. Install exposed channel edge trim according to manufacturer’s written instructions.

3.5 LAY-IN PANEL INSTALLATION

A. Panel Installation: Install acoustical panels for accurate fit with suspension system and trim members. Scribe and cut panels at ceiling perimeter and at obstructions to provide neat, precise fit.

1. Tegular-edge panel installation: Install in strict compliance with manufacturers installation instructions. Touch-up raw edge material to match adjacent edge.

3.6 ADJUST AND CLEAN

A. Use ceiling manufacturer's recommended methods and materials to clean and touch-up exposed components of ceiling system.

B. Replace ceiling system components which are discolored or damaged in any way, in a manner which results in the ceiling system showing no evidence of replacement work.

END OF SECTION

INTERIOR PAINTING AND FINISHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following interior substrates:

1. Steel.
2. Wood.
3. Gypsum board.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches (200 mm) square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

C. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. VOC content.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.5 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Benjamin Moore & Company.
2. ICI Paints.
3. PPG Architectural Finishes, Inc.
4. Sherwin-Williams Company (The).

B. Products: Provide product listed in other Part 2 articles for the paint category indicated or equal products of manufacturers in paragraph above.

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. Colors: As indicated on the plans, schedules, and Color/Finish Legend.

2.3 PRIMERS/SEALERS

A. Latex, for Gypsum Board:
1. S-W ProMar 200 Latex Primer, B28W8200.

B. Latex, Primer for Wood:
1. S-W Premium Wall and Wood, B28W0111.

C. Latex, Primer for Steel:
1. S-W Multi-Purpose Interior/Exterior Latex Primer/Sealer, B51-450 Series.

2.4 INTERMEDIATE AND TOP COATS

A. Latex, Semi-gloss:
   1. S-W ProMer 200 Latex Semi-Gloss, B31W2200 Series.

B. Alkyd, Semi-Gloss:
   1. S-W ProClassic Interior Alkyd Semi-Gloss, B34-1150 Series.

2.5 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove non-complying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two (2) paints are incompatible.

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. Wood: 15 percent.
2. Gypsum Board: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth and proper level of finish has been applied.

D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

E. 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 indicated.

B. 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 if any.

C. 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.

D. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer. But not less than the following:

1. SSPC-SP 2, "Hand Tool Cleaning."
2. SSPC-SP 3, "Power Tool Cleaning."
3. SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
4. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."

C. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces. F. Wood Substrates:

1. Sand wood surfaces with 100 grit sandpaper to provide smooth surface, ease edges.
2. Scrape and clean knots, and apply coat of knot sealer before applying primer.
3. Sand surfaces that will be exposed to view, and dust off.
4. Prime edges, ends, faces, undersides, and backsides of wood.
5. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.

3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
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. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. 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.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed in occupied spaces:

   a. Un-insulated metal piping.
   b. Pipe hangers and supports.
   c. Metal conduit.
   d. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
   e. Other items as directed by Owner.

2. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. 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 Owner, and leave in an undamaged condition.

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

3.6 INTERIOR PAINTING SCHEDULE

A. Gypsum Board Substrates:

1. Latex, Semi-Gloss (Flat for ceilings):
   a. Prime Coat: Latex, for gypsum board.
   b. Intermediate Coat: Same as topcoat.
   c. Topcoat: Latex, Semi-Gloss.
   d. Topcoat: Latex, Flat for ceilings.

B. Wood Substrates: Paint finish:
1. Alkyd Semi-Gloss:

   a. Prime Coat: Latex, Interior Primer for wood.
   b. Intermediate Coat: Same as topcoat.
   c. Topcoat: Alkyd, Semi-Gloss.

C. Steel Substrates:
1. Alkyd Semi-Gloss:

   a. Prime Coat: Latex Primer for Steel.
   b. Intermediate Coat: Same as topcoat.
   c. Topcoat: Alkyd, Semi-Gloss.

END OF SECTION

MECHANICAL

MECHANICAL GENERAL PROVISIONS

GENERAL:

The General Conditions of the Specifications, along with the supplementary conditions, special conditions, information to bidders, and any other pertinent information and documents shall apply the same as if repeated herein.

SCOPE OF WORK:

Furnish all labor and material necessary to provide and install the complete mechanical portion of this Contract for Air Conditioning, Heating and Ventilating Systems as called for herein and on accompanying drawings. Parts of the mechanical division may be bid separately or in combination, at the Contractor's option; however, it shall be the responsibility of the General Contractor to assure himself that all items covered in the Mechanical Division have been included if he chooses to accept separate bids.

This Contractor shall refer to the existing drawings and install equipment, piping, etc. to meet building and space requirements. No equipment shall be bid on or submitted for approval if it will not fit in the space provided.

It is the intention of these Specifications that all mechanical systems shall be furnished complete with all necessary valves, controls, insulation, piping, devices, equipment, etc. necessary to provide a satisfactory installation in working order.

Contractor shall visit the site and acquaint himself thoroughly with all existing facilities and conditions which would affect his portion of the work. Failure to do so shall not relieve the Contractor from the responsibility of installing his work to meet the conditions.

This Contractor shall protect the entire system and all parts thereof from injury throughout the project and up to acceptance of the work. Failure to do so shall be sufficient cause for the Owner to reject any piece of equipment.

DEMOLITION:

The contractor shall visit the site prior to bid to determine the extent of work required to complete the project.

Contractor shall coordinate demolition with owner. The Owner shall have “First Right of Refusal” regarding salvage of all equipment and materials to be removed. Locate equipment as directed by owner. All equipment and materials not salvaged by the owner shall be removed from the site and discarded at the contractor’s expense.

Contractor shall coordinate all work with the Owner and phase work as required by project.

All equipment piping, etc. required to be removed to accommodate the modifications shall be removed.

Contractor shall maintain services to existing adjacent facilities which shall remain occupied during and after construction is complete.

Contractor shall coordinate any shutdown of services with the owner. Contractor shall schedule shut down of services with the owner in order to prevent disruption of building occupancy.
Contractor shall be responsible for draining down of existing systems to complete demolition work in phases. All work shall be scheduled with the owner. Contractor shall also be responsible for refilling system and removing all air in order to return the systems to proper operating conditions.

All shut-down of services shall be done at night or during a time period approved by the owner. The systems shall be required to be back up and running each morning unless otherwise approved by the owner.

CUTTING AND PATCHING:

Initial cutting and patching shall be the responsibility of the Contractor. The Mechanical Contractor shall be responsible for laying out and marking all holes required for the reception of his work. No structural beams or joists shall be cut or thimbled without first receiving the approval of the Owner. After initial surfacing has been done, any further cutting, patching and painting shall be done at the Contractor's expense.

FILL AND CHARGES FOR EQUIPMENT:

Fill and charge with materials or chemicals all those devices or equipment as required to comply with the manufacturer's guarantee or as required for proper operation of the equipment.

CLEANING AND ADJUSTING:

Upon completion of his work, the Contractor shall clean and adjust all equipment, controls, valves, etc.; clean all piping, ductwork, etc.; and leave the entire installation in good working order.

OPERATING AND MAINTENANCE INSTRUCTIONS:

Provide services of authorized representatives of the manufacturer to ensure that the equipment is installed according to the manufacturer’s recommendations and is operating properly and to instruct the Owner’s operating personnel during start-up and operating tests of complete mechanical systems. Prove proper operation of equipment to the Owner. Notify the Owner seven (7) days prior to beginning equipment start-up.
Certify in writing that these services have been performed.

Provide the Owner with three (3) copies of printed instructions indicating various pieces of equipment by name and model number, complete with parts lists, maintenance and repair instructions and test and balance report.

COPIES OF SHOP DRAWINGS WILL NOT BE ACCEPTABLE AS OPERATION AND MAINTENANCE INSTRUCTIONS.

This information shall be bound in plastic hardbound notebooks with the job name permanently embossed on the cover. Rigid board dividers with labeled tabs shall be provided for different pieces of equipment. Submit manuals to the Owner for approval.

In addition to the operation and maintenance brochure, the Contractor shall provide a separate brochure which shall include registered warranty certificates on all equipment, especially any pieces of equipment which carry warranties exceeding one (1) year.
The operation and maintenance brochure shall be furnished with a detailed list of all equipment furnished to the project, including the serial number and all pertinent nameplate data such as voltage, amperage draw, recommended fuse size, etc. The Contractor shall include this data on each piece of equipment furnished under this contract.
SERVICE:

Inspect, clean and service air filters and strainers immediately prior to final acceptance of project.

Provide lubrication for operation of equipment until final acceptance of the equipment by the Owner. Protect bearings during installation and thoroughly grease steel shafts to prevent corrosion. Provide extended lubrication lines for parts requiring lubrication which are concealed or inaccessible.

Provide complete and working charge of proper refrigerant, free of contaminants, into each refrigerant system. After each system has been in operation long enough to ensure completely balanced condition, check the charge and modify it for proper operation as required.

Place mechanical systems in complete working order and clean and polish fixtures, equipment and materials thoroughly returning to “as new” condition prior to request for final review.

Remove excess material and debris. Clean out lines and fittings and adjust valves. Broom clean areas. Thoroughly clean ductwork inside and outside before grilles are installed.

GUARANTEE:

The Contractor shall guarantee all materials, equipment and workmanship for a period of one (1) year from the date of Notice of Final Acceptance of the project. This guarantee shall include furnishing of all labor and material necessary to make any repairs, adjustments or replacement of any equipment, parts, etc. necessary to restore the project to first class condition. During this period, make good faults or imperfections that may arise due to defects or omissions in materials or workmanship with no additional compensation and as directed by the Owner. This guarantee shall exclude only the changing or cleaning of filters. Warranties exceeding one (1) year are hereinafter specified with individual pieces of equipment.

If the Contractor's office is in excess of a one fifty (50) mile radius of the project, he shall appoint a local qualified contractor to perform any emergency repairs or adjustments required during the guarantee period. The name of the contractor appointed to provide emergency services shall be submitted to the Owner for his approval.

LOCAL CONDITIONS:

The location and elevation of all utility services is based on available plans and are reasonably accurate; however, these shall serve as a general guide only, and the Contractor shall visit the site and verify the location and elevation of all services to his satisfaction in order to determine the amount of work required for the execution of the Contract.

In case major changes are required, this fact, together with the reasons therefor, shall be submitted to the Owner, in writing, not less than seven (7) days before the date of bidding. Failure to comply with this requirement will make the Contractor liable for any changes, additions, and expenses necessary for the successful completion of the project.

PERMITS, INSPECTIONS AND TESTS:

All permits, fees, etc. for the installation, inspections, plan review, service connection locations, equipment inspections, and/or construction of the work which are required by any authority and/or agencies having jurisdiction, shall be obtained and paid for by the Contractor throughout the duration of the project.

The Contractor shall make all tests required by the Owner or other governing authorities at no additional cost to the Owner.

The Contractor shall notify the Owner and local governing authorities before any tests are made, and the tests are not to be drawn off a line covered or insulated until examined and approved by the authorities. In event defects are found, these shall be corrected, and the work shall be retested.

Prior to requesting final inspection by the Owner, the Contractor shall have a complete coordination and adjustment meeting of all of his sub-contractors directly responsible for the operation of any portion of the system. At the time of this meeting, each and every sequence of operation shall be checked to assure proper operation. Notify the Owner in writing ten (10) days prior to this meeting, instructing him of the time, date and whom you are requesting to be present.

This project shall not be accepted until the above provisions are met to the satisfaction of the Owner.

CODES AND STANDARDS:

The entire mechanical work shall comply with the rules and regulations of the City, Parish and State in which this project is being constructed, including the State Fire Marshal, State Office of Public Health, Local Heath Unit, OSHA, ANSI. All modifications required by these authorities shall be made without additional charge to the Owners. The Mechanical Contractor shall report these changes to the Owner and secure his approval before work is started.

In addition to the codes heretofore mentioned, all mechanical work and equipment shall conform to the applicable portions of the following specifications, codes and/or regulations:

1. American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
2. National Electrical Code (NEC)
3. National Fire Protection Association (NFPA)
4. American Society of Mechanical Engineers (ASME)
5. American Gas Association (AGA)
6. Building Code (Latest local approved with local amendments)
7. Mechanical Code (Latest local approved with local amendments)
8. Fuel Gas Code (Latest local approved with local amendments)
9. Underwriters Laboratories (UL)
10. International Plumbing Code (IPC – latest addition)

All materials, equipment and accessories installed under this Contract shall conform to all rules, codes, etc. as recommended by National Associations governing the manufacturer, rating and testing of such materials, equipment and accessories. All materials shall be new and of the best quality and first class in every respect. Whenever directed by the Owner, the Contractor shall submit a sample for approval before proceeding.

Where laws or local regulations provide that certain accessories such as gauges, thermometers, relief valves and parts be installed on equipment, it shall be understood that such equipment be furnished complete with the necessary accessories, whether or not called for in these Specifications.

All unfired pressure vessels shall be built in accordance with the A.S.M.E. Code and so stamped. Furnish shop certificates for each vessel.

REVIEW OF MATERIALS:

Whenever manufacturers or trade names are mentioned in these Plans or Specifications, the words "or Prior Approved Equivalent" shall be assumed to follow whether or not so stated. Manufacturers or trade names are used to establish a standard of quality only and should not be construed to infer a preference. Equivalent products which meet the Owner's approval will be accepted; however, these products must be submitted to the Owner a minimum of ten (10) days prior to the Bid Date. Faxed copies or electronic submissions via E-Mail will not be accepted.

Submission shall include the manufacturer's name, model number, rating table and construction features. Incomplete information which does not provide adequate information to verify compliance with specifications shall be grounds for rejection of submitted equipment or materials.

Upon receipt and checking of this submittal, the Owner will issue an addendum listing items which are approved as equivalent to those specified. THE CONTRACTOR SHALL BASE HIS BID SOLELY ON THOSE ITEMS SPECIFIED OR INCLUDED IN THE "PRIOR APPROVAL ADDENDUM", AS NO OTHER ITEM WILL BE ACCEPTABLE.

Prior approval of a particular piece of equipment does not mean automatic final acceptance and will not relieve the Contractor of the responsibility of assuring himself that this equipment is in complete accordance with the Plans and Specifications and that it will fit into the space provided. Shop drawings must be submitted on all items of equipment for approval as hereinafter specified.

Before proceeding with work and/or within thirty (30) days after the award of the General Contract for this work, the Mechanical Contractor shall furnish to the Owner complete shop and working drawings of such apparatus, equipment, controls, insulation, etc. to be provided in this project. These drawings shall give dimensions, weights, mounting data, performance curves and other pertinent information.

The Owner's approval of shop drawings shall not relieve the Contractor from the responsibility of incorrectly figured dimensions or any other errors which may be contained in these drawings. Any omission from the shop drawings or specifications, even though approved by the Owner, shall not relieve the Contractor from furnishing and erecting same.

Ten (10) sets of shop drawings shall be submitted to the Owner for approval. These submittals shall be supplied as part of this Contractor's contract. Any drawings not approved shall be resubmitted until they are approved.

MINOR DEVIATIONS:

Plans and detail sketches are submitted to limit, explain and define conditions, specified requirements, pipe sizes and manner of erecting work. Structural or other conditions may require certain modifications from the manner of installation shown, and such deviations are permissible and shall be made as required. However, specified sizes and requirements necessary for satisfactory operation shall remain unchanged. It may be necessary to shift ducts or pipes, or to change the shape of ducts, and these changes shall be made as required. All such changes shall be referred to the Owner for approval before proceeding. Extra charges shall not be allowed for these changes. The contractor shall obtain a full set of plans and specifications for the coordination of his work prior to bidding this project. Items which are unclear to the bidding contractor shall be brought to the Owner's attention prior to bidding the project. An interpretation shall be clarified by the Owner prior to bidding.

The Contractor shall realize that the drawings could delve into every step, sequence or operation necessary for the completion of the project, without drawing on the Contractor's experience or ingenuity. However, only typical details are shown on the Plans. In cases where the Contractor is not certain about the method of installation of his work, he shall ask for details. Lack of details will not be an excuse for improper installation.

In general, the drawings are diagrammatic, and the Contractor shall install his work in a manner so that interferences between the various trades are avoided. In cases where interferences do occur, the Owner is to state which item was first installed.

AS-BUILT DRAWINGS:

The Contractor shall obtain at his cost, two sets of black-line prints of the original bid documents by the Owner. One set shall be kept on the site with all information as referenced below and shall update same as the work progresses. The other set will be utilized to record all field changes to a permanent record copy for the Owner.

If the Contractor elects to vary from the Contract Documents and secures prior approval from the Owner for any phase of the work, he shall record in a neat and readable manner, ALL such variances on the black-line print in red. The original blue lines shall be returned to the Owner for documentation.

All deviations from sizes, locations, and from all other features of the installations shown in the Contract Documents shall be recorded.

In addition, it shall be possible using these drawings to correctly and easily locate, identify and establish sizes of all piping, directions, and the like, as well as other features of the work which will be concealed underground and/or in the finished building.

Locations of underground work shall be established by dimensions to columns, lines, or walls, locating all turns, etc., and by properly referenced centerline or invert elevations and rates of fall.

For work concealed in the building, sufficient information shall be given so it can be located with reasonable accuracy and ease. In some cases, this may be by dimension. In others, it may be sufficient to illustrate the work on the drawings in relation to the spaces in the building near which it was actually installed. The Owner's decision in this matter will be final.

The following requirements apply to all "As-Built" drawings:

1) They shall be maintained at the Contractor's expense.
2) All such drawings shall be done carefully and neatly, and in a form approved by the Owner.
3) Additional drawings shall be provided as necessary for clarifications.
4) These drawings shall be kept up-to-date during the entire course of the work and shall be available upon request for examination by the Owner; and when necessary, to establish clearances for other parts of the work.
5) "As-built" drawings shall be returned to the Owner upon completion of the work and are subject to approval of the Owner.

MANUFACTURER'S DIRECTION:

The mechanical contractor shall install and operate all equipment and materials in strict accordance with the manufacturer's installation and operating instructions. The manufacturer's instructions shall become part of the Contract Documents and shall supplement the Drawings and Specifications.

Store equipment in a clean, dry place protected from other construction. While stored, maintain factory wrapping or tightly cover and protect equipment against dirt, water, construction debris, chemical, physical, or weather damage, traffic and theft.

LABELING MECHANICAL EQUIPMENT:
All mechanical equipment (Indoor Units, Outdoor Units, Thermostats, etc.) furnished under of contract documents shall be labeled with permanent laminated plate secured to equipment. Units shall be labeled as indicated on plans and schedules and with commissioning addresses used by the manufacturer.

BASIC MATERIALS AND METHODS

PIPE:

CONDENSATE DRAIN LINES:

Piping and fittings shall be constructed of American Made **solid wall** Schedule 40 PVC "DWV" plastic pipe and fittings with solvent welded joints as manufactured by Charlotte Pipe and Foundry or J M Manufacturing. All piping shall conform to ASTM D 1784, all fittings shall conform to ASTM D 2665, and solvent cement joints shall be made in a two (2) step process with colored primer and cement conforming to ASTM D 2564. All piping components shall be NSF Standard 14..

Cellular foam core piping will **NOT** be considered for use.

Condensate Drainage System Pipe shall be supported at no more than 5 ft. intervals with steel hangars secured in the existing structure above.

REFRIGERANT LINES:

These shall be Government Type "L" hard copper.

At contractor's option, piping for ductless mini-split systems and Variable Refrigerant Flow systems may be ACR type L refrigerant soft tubing. Tubing shall be properly straightened for clean straight installation and all bends shall be made with a conduit bender. Excessive bends, curves, etc. in the installations will not be accepted.

INSTALLATION OF PIPING:

All pipe shall be true and straight, without sags or traps.

The Contractor shall exercise care in cleaning joints after making cuts on pipe to prevent pipe particles from entering the system.

All pipe fittings shall be same as piping specified unless indicated otherwise.

Arrange, install piping approximately as indicated, straight, plumb and as direct as possible; form right angles, or parallel lines with building walls. The most practical appearance of piping runs is required. Keep pipes close to walls, partitions, ceilings; off-set only where necessary to follow walls as directed.

Before installing piping, check existing conditions to make accurate layout of HVAC piping. Where interferences may appear and departures from indicated arrangements are required, consult with other trades involved; come to agreement as to changed locations and elevations of piping; obtain approval of proposed changes. Note runs of other contractor's piping and large conduits and cooperate to achieve neat appearance.

Unless otherwise indicated, conceal all piping in building construction in finished areas.

Locate groups of pipes parallel to each other and building lines; space them at distance to permit access for servicing, valves, and to create most practical appearance when racked with conduits, refrigerant, etc., provided by other contractors.
Keep fixture branches concealed to points above floor close to fixtures; expose only as much as necessary for final connection.

Rigidly support pipes projecting from walls, chases, etc. to make firm, well-braced installation. Loosely supported pipe or accessory is not acceptable.

Install horizontal piping to coordinate with other trades and install without sags or humps.

Grade inside condensate piping at uniform slope of 1/4 inch per foot, minimum; where this is impossible, maintain slope as directed but in no case less than 1/8 inch per foot. Waste lines 3 inches and smaller must grade at minimum 1/4 inch per foot. See Drawings for fall on exterior sewer lines.

Grade other piping as specified under heading or service where used, or as directed.

Keep piping free from scale and dirt, protect open pipe ends wherever work is suspended during construction. To prevent foreign bodies entering and lodging in pipe, use temporary plugs or other approved material.

Where changes in pipe sizes occur, do not bush down; use only reducing fittings. For drainage piping changes in direction, use long-sweep-bends where possible; otherwise, short sweep 1/4 bends or combination Y and 1/8 bends; also, Y's in combination with other bends.

Provide shut off valves at all connections to all equipment. Supplier of equipment shall provide rough-in drawings and this contractor shall fully connect all items, supply necessary piping and fittings as required, unless otherwise noted individually.

Do not locate valves with stems below horizontal.

Locate valves for easy access and operations. Where concealed, verify exact location in order that openings are provided for access panels. Provide access panels.

Provide unions, screwed or flanged, where indicated, and in following the locations even if not indicated.

1. In connection to equipment requiring disconnection for repairs or replacement. Locate between shut-off and equipment.

RATED WALL OR FLOOR PENETRATIONS:

Piping penetrating fire rated walls, floors, or ceilings shall be sealed with fire rated sealant in accordance with the manufacturer's recommendations for the specific U.L. Assembly.

PIPE HANGERS AND SUPPORTS:

This Contractor shall furnish and install all foundations and supports required for his equipment unless indicated otherwise on the Drawings.

This Contractor shall furnish and install all escutcheons, inserts, thimbles, hangers, etc. required for the proper support and installation of his equipment and piping and he shall cooperate with other trades in locating and placing these items.

PROVIDE SLEEVES FOR ALL PIPES PASSING THROUGH WALLS, FLOORS, BEAMS, ETC.:

Sleeves passing through structural members or concrete footings shall be of cast iron or Schedule 40 steel pipe. Sleeves passing through nonstructural walls or floors shall be of 26 gauge galvanized iron. Joints between sleeves and pipes passing through floors shall be made weather-tight with plastic materials. Where pipes pass through water proofing membrane, flashing sleeves shall be installed.

Provide Grinnell, Fee & Mason, or equivalent malleable iron split ring hangers with rod supports throughout. STRAP HANGERS OR WIRE WILL NOT BE ACCEPTED.

Maximum spacing of hangers for cast iron pipes shall be 5 ft.
Provide galvanized iron shields between hangers and pipe covering.

Provide Grinnel, Fee & Mason, Crane or equivalent heavy steel riser clamps on vertical risers at floors to support pipes.

All piping projecting from chases shall be rigidly supported in the wall or chase. Loosely supported fixtures or accessories will not be accepted.

VALVES AND UNIONS:

Furnish and install all valves shown on plans as necessary to make a complete system in working order. Provide valves on inlet and outlet of all equipment.

Ball Valves as recommended by equipment manufacturer shall be installed for shut-off/isolation requirements.

INSTALLATION OF VALVES:

Use ball valves for shut-off duty.

Locate valves for easy access and provide separate support where necessary.

Install valves in horizontal piping with stem at or above the center of the pipe.

Install valves in a position to allow full stem movement.

ELECTRICAL WORK:

The Mechanical Contractor shall coordinate with the Electrical Contractor for installation of equipment. All electrical work not indicated on the electrical drawings that is required to provide a complete operable HVAC System shall be the responsibility of the Mechanical Contractor. The Mechanical Contractor shall provide sub-contractor(s) capable of preforming the required scope of work. All work shall be coordinated with the drawings.

INSULATION

GENERAL:

Pipe insulation shall not begin until all work has been tested and found to be tight. All insulation jackets, adhesives, sealers, tapes, and mastic shall meet the latest NFPA requirements and shall meet 25/50 flame spread and smoke developed ratings.

All insulation shall be installed in strict accordance with the manufacturer's recommendations.

All pipe insulation where recommended by the manufacturer shall be banded with aluminum bands, three to a section and with one band on each side of each fitting, valve, etc.

Insulation shall be continuous through walls and ceilings.

All valves, strainers, etc. shall be insulated the same as its adjacent piping and the covering shall extend all the way up to the equipment.

SCOPE OF WORK:

The work included in this section consists of furnishing labor, materials and tools required in insulating the systems as described in these specifications or shown on accompanying drawings. Services shall include coordination with all trades, and final verification of all installation prior to wall or ceiling closure.

USE HIGH DENSITY INSULATION INSERTS AT HANGERS ON ALL PIPING 1.5" AND ABOVE TO PREVENT CRUSHING OF INSULATION.

THERMAL INSULATION:

After all work has been tested and approved, insulate as follows:

INSULATION SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND INSTRUCTIONS.

CONDENSATE DRAIN PIPING:

All condensate drain lines between the Indoor Unit and the condensate drainage system shall be insulated with 2" thick 3/4 # density fiberglass ductwrap insulation with aluminum foil vapor barrier. Insulation shall be sealed at all seams and joints. Insulation shall be installed with a foil backed adhesive tape around the diameter of the pipe at 24" on center intervals.

REFRIGERANT LINES:

Insulate with 3/4" close cell elastomeric thermal tube insulation as manufactured by Armaflex AP, Rubatex or prior approved equivalent. All joints are to be firmly butted together. All lap and butt joint strips are to be sealed in place with vapor barrier adhesive. Fittings are to be mitered segments of insulation held in place with vapor barrier sealant. Engineered Polymer Foam Insulation (EPFI) will not be accepted. Insulation shall be applied in accordance with manufacturer’s recommendations and instructions.

Apply two coats of weatherproof mastic on all piping below grade or exposed to weather.

All refrigerant lines for ductless mini-split systems, Variable Refrigerant Flow systems (liquid, gas, and Recovery piping) shall be insulated.

All refrigerant lines on the outside of the building exposed to the weather shall be covered with 0.016 smooth aluminum jacket and elbows. At contractor’s option, in lieu of 0.016 aluminum jacket, the contractor may use Venture Clad 1577CW multi-layered laminate coated, acrylic pressure sensitive adhesive jacket system.

HVAC DUCTWORK INSULATION:

Low Pressure Outside Air ductwork shall be wrapped on outside with 2.125" minimum thickness, 3/4# density, minimum installed R-value of R-6.0, fiberglass insulation with aluminum foil vapor barrier. Insulation shall be taped at all joints and installed per the manufacturer's recommendations.

Secure insulation with vapor barrier and seal jacket joints with vapor barrier adhesive or tape to match jacket. Install without sag on underside of ductwork. Use 4" wide strips of adhesive (Foster 85-60 or Childers CP-127 water based adhesive) on 8 inch centers or mechanical fasteners 12" on center to prevent sagging. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping. Cover seams, joints, pin penetrations and other breaks with Foster 30-65 or Childers CP-34 vapor barrier coating reinforced with reinforced glass cloth. Reinforcing mesh shall be Foster Mast A Fab or Childers Chil Glas #10.

INSULATION THROUGH HANGERS AND SLEEVES:

The insulation shall be continuous through pipe hangers and pipe sleeves. At hangers where the pipe is supported by insulation, provide a galvanized iron protection shield. Provide 18 gauge metal saddles between all hangers and insulation.

INSULATION THROUGH FLANGES, VALVES, ELBOWS, ETC.:

The insulation shall be continuous around valves, elbows, and other devices located in the piping system.

AIR CONDITIONING, HEATING AND VENTILATING

GENERAL:

The air conditioning system, in general, shall be for the entire building, providing cooling and dehumidification in summer and heating in winter. A constant amount of fresh air shall be taken into the system and all air shall be filtered.

VARIABLE REFRIGERANT FLOW EQUIPMENT:

The variable capacity, heat pump heat recovery air conditioning system shall be a Mitsubishi Electric CITY MULTI VRFZ (Variable Refrigerant Flow Zoning) System. The systems shall provide simultaneous cooling and heating split system outdoor units and indoor units.

The simultaneous systems shall consist of an outdoor unit, BC (Branch Circuit) Controller(s) (Single, Main, or Main with Sub(s), multiple indoor units, and Direct Digital Controls. The simultaneous outdoor unit shall be a vertical discharge type unit.

The units shall be listed by Electrical Laboratories (ETL) and bear the ETL label.
Equipment shall meet the latest requirements of ASHRAE 90.1 2010 Standards.
All wiring shall be in accordance with the National Electrical Code (N.E.C.).

A full charge of R-410A for the condensing unit only shall be provided in the condensing unit. The contractor shall provide refrigerant as required to properly charge the refrigerant piping system.
Units shall be stored and handled according to the manufacturer’s recommendation.

The units shall be covered by the manufacturer's limited warranty for a period of one (1) year from date of substantial completion of the project. The contractor shall be responsible for one (1) years labor warranty for the entire installation (including but not limited to material/equipment provided by the owner.

Contractor shall be responsible for (1) one year parts and labor warranty for all materials furnished and installed by the contractor.

Contractor shall also be responsible for any refrigerant lost during the (1) one year warranty period resulting from any leaks that develop.

The contractor shall provide the following system features:

1) The system, refrigerant piping, and controls designed by a factory certified Designer.
2) The system, refrigerant piping, and controls shall be installed by a certified Dealer.
3) The entire system shall be verified with a completed commissioning report submitted to the manufacturer by a factory authorized agent. The units shall then be covered by an extended manufacturer's limited warranty for a period of five (5) years from date of installation. The contractor will be required to provide a certified designer, Commissioning Report, etc.

In addition, the compressors shall have a manufacturer's limited warranty for a period of six (6) years from date of substantial completion of the project.

If, during this period, any part should fail to function properly due to defects in workmanship or material, it shall be replaced or repaired at the discretion of the manufacturer.

This extended warranty shall not include labor.

The VRF system shall be installed by an authorized manufacturer's Dealer with extensive manufacturer's installation and service training. The mandatory contractor service and installation training should be performed by the equipment manufacturer.

In order to obtain the manufacturer's extended warranty, the contractor installing the VRF equipment must have completed the installation, service, and designer training prior to first date of advertisement for bids for this project. A minimum of two (2) people must be actively employed by the contractor and have certificates showing successful completion of the installation, service, and designer training by an approved VRF manufacturer. The sub-contractor shall only bid on equipment that they have completed the training (noted above) from the manufacturer of the product that the contractor intends to use on the project prior to bid date of the project. Training certificates must be submitted with the construction schedule and schedule of values at the Pre-Construction Conference at the beginning of the project.

The mechanical contractor shall be responsible for informing the electrical contractors bidding the project of any differences in electrical required by specific manufacturers (e.g.: individual motor rated switches for Refrigerant Flow Controllers (e.g.: BC, etc.), additional power wiring, etc.) to accommodate a specific manufacturer. These modifications required to accommodate a manufacturer shall be provided at no additional cost to the owner.

Refrigerant piping throughout the entire project shall be installed in accordance with manufacturer's recommendations. The manufacturer shall provide a qualified representative to visit the site (minimum of 2 visits) to review installation and submit a written report indicating that the system is being installed in accordance with the manufacturer's recommendations.

All refrigerant piping shall be installed in accordance with manufacturer's recommendations with proper spacing between joints, between joints and elbows, between elbows and refrigerant flow controllers, etc. Refrigerant Flow Diagrams and control wiring diagrams shall be included with shop drawings.
OUTDOOR UNIT (SIMULTANEOUS COOLING & HEATING)

The outdoor unit shall be used specifically with approved manufacturer's components. The system shall consist of the outdoor unit, Branch Circuit (BC) Controller, indoor units, and DDC (Direct Digital Controls). The outdoor units shall be equipped with multiple circuit boards that interface to the controls system and shall perform all functions necessary for operation. The outdoor unit shall have a powder coated finish. The outdoor unit shall be completely factory assembled, piped and wired. Each unit shall be run tested at the factory.

The sum of connected capacity of all indoor air handlers shall range from 50% to 150% of outdoor rated capacity (or as approved by the equipment manufacturer).
Outdoor unit shall have a sound rating no higher than 63 dB(A).

All refrigerant lines from the outdoor unit to the BC (Branch Circuit) Controller (Single or Main) shall be insulated.
The outdoor unit shall have an accumulator with refrigerant level sensors and controls.
The outdoor unit shall have a high pressure safety switch, over-current protection, and DC bus protection.
The outdoor unit shall have the ability to operate with a maximum height difference of 164 feet and have total refrigerant tubing length of 984-1312 feet. The greatest length is not to exceed 492 feet between outdoor unit and the indoor units without the need for line size changes or traps. Limits shall be approved by the manufacturer.

The outdoor unit shall be capable of operating in heating down to -4°F ambient temperature without additional low ambient controls.

The outdoor unit shall have a high efficiency oil separator plus additional logic controls to ensure adequate oil volume in the compressor is maintained.
Unit Cabinet shall be fabricated of galvanized steel, bonderized and finished with a powder coated baked enamel.

Fan: The outdoor unit shall be furnished with one direct drive or two direct drive, variable speed propeller type fans. All fan motors shall have inherent protection, have permanently lubricated bearings, and be completely variable speed. All fan motors shall be mounted for quiet operation. All fans shall be provided with a raised guard to prevent contact with moving parts. The outdoor unit shall have vertical discharge airflow.

Refrigerant: R410A refrigerant shall be required for VRF systems.

Coil: The outdoor coil shall be of nonferrous construction with lanced or corrugated plate fins on copper tubing. The coil shall be protected with an integral metal guard. Refrigerant flow from the outdoor unit shall be controlled by means of an inverter driven compressor. The outdoor coil shall include 4 circuits with two position valves for each circuit, except for the last stage.

Compressor: The outdoor units shall be equipped with one inverter driven scroll hermetic compressor, or one inverter driven scroll hermetic compressor and one scroll hermetic compressor. A crankcase heater(s) shall be factory mounted on the compressor(s). The outdoor unit compressor shall have an inverter to modulate capacity. The capacity shall be completely variable down to 16% of rated capacity. The compressor will be equipped with an internal thermal overload. The compressor shall be mounted to avoid the transmission of vibration.

Electrical: The outdoor unit electrical power shall be as indicated on drawings. The outdoor unit shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253V (230V/60Hz). The outdoor unit shall be controlled by integral microprocessors. The control circuit between the indoor units, BC Controller and the outdoor unit shall be 24VDC completed using a 2-conductor, twisted pair shielded cable to provide total integration of the system.

BRANCH CIRCUIT (BC) CONTROLLERS FOR SIMULTANEOUS COOLING & HEATING:

The BC (Branch Circuit) Controllers shall be specifically used with R410A simultaneous cooling & heating systems. These units shall be equipped with a circuit board that interfaces to the controls system and shall perform all functions necessary for operation. The unit shall have a galvanized steel finish. The BC Controller shall be completely factory assembled, piped, and wired. Each unit shall be run tested at the factory. This unit shall be mounted indoors. The sum of connected capacity of all indoor air handlers shall range from 50% to 150% of rated capacity (or as recommended by the manufacturer).

Each BC Controller branch shall connect to indoor unit(s) (except heat pump systems) not exceeding 54,000 Btu/h per branch. BC Controller models and number of branch shall be in accordance with the manufacturer's requirements.

BC Unit Cabinet: The casing shall be fabricated of galvanized steel. Each cabinet shall house a liquid-gas separator and multiple refrigeration control valves. The unit shall house two tube-in-tube heat exchangers.
Refrigerant: R410A refrigerant shall be required for BC Controllers in conjunction with other VRF system components.

Refrigerant valves: The unit shall be furnished with multiple two position refrigerant valves. Each circuit shall have one (54,000 Btu/h or smaller indoor unit section) two-position liquid line valve and a two-position suction line valve. When connecting a 54,000 Btu/h or larger indoor unit section, two branch circuits shall be joined together at the branch controller to deliver an appropriate amount of refrigerant. The two refrigerant valves shall operate simultaneously. Linear electronic expansion valves shall be used to control the variable refrigerant flow.
Integral Drain Pan: An integral condensate pan, and drain shall be provided.

Each indoor and outdoor unit shall be provided with service stop valves with service port on the liquid, gas, and/ recovery lines. The valves shall be located adjacent to the unit to allow the unit to be serviced and/or removed and/or installed in the system without the need to shut down the entire system. The service port with stop valve shall also be located at the refrigerant line connection of the BC Controller for each fan coil unit and each outdoor unit connection.

The contractor shall adjust the refrigerant in the piping system as units are serviced, removed, or added to the system.

Electrical: The unit electrical power shall be as indicated on drawings. The unit shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253V (230V/60Hz). The BC Controller shall be controlled by

integral microprocessors. The control circuit between the indoor units and the outdoor unit shall be 24VDC completed using a 2-conductor, twisted pair shielded cable to provide total integration of the system.

Each unit shall be complete with a Plasma Air needle point brush type ionizer. The device shall be completely installed within the indoor unit by the product supplier.

CEILING RECESSED CASSETTE INDOOR UNIT:

The ceiling-mounted indoor unit section shall have a modulating linear expansion device. The unit shall be used with the simultaneous cooling and heating outdoor unit and BC Controller(s) or heat pump outdoor unit. The unit shall support individual control using DDC controllers.

Each system shall perform in accordance to the ratings shown in the table below. Performance shall be based on nominal cooling conditions of 80°F DB, 67°F WB for the indoor unit and 95°F DB for the outdoor unit and nominal heating conditions of 70°F DB for the indoor unit and 47°F DB, 43°F WB for the outdoor unit.

Indoor Unit: The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, and a test run switch. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory.
Unit Cabinet: The casing shall have a white finish. There shall be a supply/return grille located below the ceiling with 4-way supply air flow and center return grille. The unit shall be provided with an outdoor intake tap and taps for extending supply duct to remote ceiling grilles.

The unit shall have an integral condensate pump.

Fan: The indoor fan shall be an assembly with one fan, direct driven by a single motor. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings. A 4-way manual adjustable guide vane shall be provided with the ability to change the airflow. The indoor fan shall consist of various speeds, as indicated in below table.

Filter: Return air shall be filtered by means of an easily removable, washable filter.

EXTRA MATERIALS: The supplier shall provide two (2) sets of filters for each indoor unit. Filters shall be turned over to the owner at the completion of the project.

Coil: The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing. The tubing shall have inner grooves for high efficiency heat exchange. All tube joints shall be brazed with phos-copper or silver alloy. The coils shall be pressure tested at the factory. A plastic or stainless steel condensate pan and drain shall be provided under the coil. Both refrigerant lines to the indoor units shall be insulated.

Each indoor unit shall be provided with service stop valves with service port on the liquid, gas, and/ recovery lines. The valves shall be located adjacent to the unit to allow the unit to be serviced and/or removed and/or installed in the system without the need to shut down the entire system.

CONDENSATE DRAIN CONNECTION: The contractor shall remove the plastic condensate hose clamp (at the indoor unit connection) on each unit. Furnish and install a stainless steel hose clamp on the condensate drain hose (at the indoor unit connection) on each unit. The stainless steel hose clamp shall be appropriately sized to create a water tight seal.

Electrical: The unit electrical power shall be as indicated on drawings. The system shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253 volts (230V/60Hz)

Each unit shall be complete with a Plasma Air needle point brush type ionizer. The device shall be completely installed within the indoor unit by the product supplier.

CONTROLS

The Controls Network shall be capable of supporting remote controllers, schedule timers, system controllers, centralized controllers, an integrated web based interface, graphical user workstation, and system integration to Building Management Systems via BACnet®.

The Controls Network shall operate at 24VDC. Controller power and communications shall be via a common non-polar communications bus.

Control wiring shall be installed in a system daisy chain configuration from the indoor unit(s) to remote controller for indoor unit(s), and to the outdoor unit. Control wiring to remote controllers shall be run from the indoor unit terminal block to the controller associated with that unit.
Control wiring for schedule timers, system controllers, and centralized controllers shall be installed in a daisy chain configuration from outdoor unit to outdoor unit, to system controllers, to the power supply.

Control wiring for the Simple controllers shall be from the remote controller to the first associated indoor unit then to the remaining associated indoor units in a daisy chain configuration.

The system controller shall be capable of being networked with other system controllers for web based control.

Wiring type:
Wiring shall be 2-conductor (16 AWG or 18 AWG), twisted shielded pair, stranded wire, as defined by the Design Tool AutoCAD output.
Network wiring shall be CAT-5e with RJ-45 connection.

The Controls Network (CMCN) shall be capable of supporting remote controllers, schedule timers, system controllers, centralized controllers, an integrated web based interface, graphical user workstation, and system integration to Building Management Systems via BACnet®.

The CMCN shall operate at 24VDC. Controller power and communications shall be via a common non-polar communications bus.

Control wiring shall be installed in a system daisy chain configuration from indoor unit to ME remote controller to indoor unit, to the BC controller (main and subs, if applicable) and to the outdoor unit. Control wiring to remote controllers shall be run from the indoor unit terminal block to the controller associated with that unit.

Control wiring for schedule timers, system controllers, and centralized controllers shall be installed in a daisy chain configuration from outdoor unit to outdoor unit, to system controllers, to the power supply.

Control wiring for the Deluxe, Simple, and Wireless remote controllers shall be from the remote controller to the first associated indoor unit then to the remaining associated indoor units in a daisy chain configuration.

The system controller shall be capable of being networked with other system controllers for web based control.
Wiring type:
Wiring shall be 2-conductor (16 AWG or 18 AWG), twisted shielded pair, stranded wire, as defined by the Design Tool AutoCAD output.
Network wiring shall be CAT-5e with RJ-45 connection.

The Controls Network (CMCN) shall consist of remote controllers, schedule timers, system controllers, centralized controllers, and integrated web based interface communicating over a high-speed communication bus. The Controls Network shall support operation monitoring, scheduling, error email distribution, personal browsers, tenant billing, online maintenance support, and integration with Building Management Systems (BMS) using BACnet® interfaces.

The Wall Mounted Remote Controller shall be capable of controlling up to 16 indoor units (defined as 1 group). The Wall Mounted Remote Controller shall be compact in size, approximately 3” x 5” and have limited user functionality. The Wall Mounted Remote Controller shall allow the user to change on/off, temperature setting, and fan speed setting. The room temperature shall be complete with a temperature sensor with the controller so that space temperature to control the respective unit(s) will be sensed at either the Wall Mounted Remote Controller or the Indoor Unit (temperature sensor in the return air) dependent on the indoor unit dip-switch setting. The Wall Mounted Remote Controller shall display a four-digit error code in the event of system abnormality/error. All temperatures shall be displayed and/or communicated in degrees Fahrenheit.

The Wall Mounted Remote Controller shall only be used in same group with up to two remote controllers per group. The Wall Mounted Remote Controller shall require no addressing. The Wall Mounted Remote Controller shall connect using two-wire, stranded, non-polar control wire to TB15 connection terminal on the indoor unit. The controller shall require cross-over wiring for grouping across indoor units.

(Simple Remote Controller)			
Item	Description	Operation	Display
ON/OFF	Run and stop operation for a single group	Each Group	Each Group
Operation Mode	Switches between Cool/Dry/Auto/Fan/Heat. Operation modes vary depending on the air conditioner unit. Auto mode is in the simultaneous only.	N/A	Each Group

Temperature Setting	Sets the temperature for a single group. Range of temperature setting Cool/Dry: 67°F-87°F Heat: 63°F-83°F Auto: 67°F-83°F	Each Group	Each Group
Fan Speed Setting	Models with 4 air flow speed settings: Hi/Mid-2/Mid-1/Low Models with 3 air flow speed settings: Hi/Mid/Low Models with 2 air flow speed settings: Hi/Low	Each Group	Each Group
Air Flow Direction Setting	Not Available	N/A	N/A
Timer Operation	Not Available	N/A	N/A
Permit / Prohibit Local Operation	Individually prohibit operation of each local remote control function (Start/Stop, Change operation mode, Set temperature, Reset filter). *1: Centrally Controlled is displayed on the remote controller for prohibited functions.	N/A	Each Group *1
Display Indoor Unit Intake Temp	Not Available	N/A	N/A
Error	When an error is currently occurring on an air conditioner unit, the afflicted unit and the error code are displayed	N/A	Each Unit
Test Run	Operates air conditioner units in test run mode. *2 The display for test run mode will be the same as for normal start/stop (does not display “test run”).	Each Group	Each Group *2

The Centralized Controller shall be capable of controlling a maximum of 50 indoor units across multiple outdoor units. The Centralized Controller shall be approximately 5”x12” in size and shall be powered from a Power Supply Unit. The Centralized Controller shall support operation superseding that of the remote controllers, system configuration, daily/weekly scheduling, monitoring of operation status, and malfunction monitoring. The Centralized Controller shall have five basic operation controls which can be applied to an individual indoor unit, a group of indoor units (up to 50 indoor units), or all indoor units (collective batch operation). This basic control set of operation controls for the Centralized Controller shall include on/off operation mode selection (cool, heat, auto (simultaneous cool/heat only, dry, and fan), temperature setting, fan speed setting, and airflow direction setting. Centralized control shall be able to enable or disable operation of local remote controllers. In terms of scheduling, the Centralized Controller shall allow the user to define both daily and weekly schedules with operations consisting of ON/OFF, mode selection, temperature setting, and permit/prohibit of remote controllers. All temperatures shall be displayed and/or communicated in degrees Fahrenheit.

(Centralized Controller)			
Item	Description	Operation	Display
ON/OFF	Run and stop operation for a single group	Each Group or Collective	Each Group or Collective
Operation Mode	Switches between Cool/Dry/Auto/Fan/Heat. (Group of Lossnay unit: automatic ventilation/vent-heat/interchange/normal ventilation) Operation modes vary depending on the air conditioner unit. Auto mode is in the simultaneous cool/heat only.	Each Group or Collective	Each Group
Temperature Setting	Sets the temperature for a single group. Range of temperature setting: Cool/Dry: 67°F-87°F Heat: 63°F-83°F Auto: 67°F-83°F * Range of temperature setting varies depending on the model.	Each Group or Collective	Each Group
Fan Speed Setting	Models with 4 air flow speed settings: Hi/Mid-2/Mid-1/Low Models with 3 air flow speed settings: Hi/Mid/Low Models with 2 air flow speed settings: Hi/Low	Each Group or Collective	Each Group
Air Flow Direction Setting	Air flow direction angles 100%-80%-60%-40%, Swing, *1. Louver cannot be set. Air flow direction settings vary depending on the model.	*1 Each Group or Collective	Each Group
Timer Operation	Start/Stop and Enable/Disable can be set 3 times in one day. For a week's schedule, store three start/stop patterns and one enable/disable pattern. *2 When the timer is set, "Timer Enabled" is shown on the operation setting screen of the LCD.	Each Group or Collective	*2 Each Group
Permit / Prohibit Local Operation	Individually prohibit operation of each local remote control function (Start/Stop, change operation mode, set temperature, Reset filter).	Each Group or Collective	*3 Each Group

	*3: Centrally Controlled is displayed on the remote controller for prohibited functions.		
Display Indoor Unit Intake Temp	Measures and displays the intake temperature of the indoor unit when the indoor unit is operating.	N/A	Each Group
Error	When an error is currently occurring on an air conditioner unit, the afflicted unit and the error code are displayed *4 When an error occurs, the LED flashes. The operation monitor screen shows the abnormal unit by flashing it. The error monitor screen shows the abnormal unit address, error code and source of detection. The error log monitor screen shows the time and date, the abnormal unit address, error code and source of detection	N/A	*4 Each Unit or Collective
Test Run	Operates air conditioner units in test run mode.	Each Group	Each Group
Ventilation Equipment	This interlocked system settings can be performed by the master system controller. When setting the interlocked system, use the ventilation switch the free plan LOSSNAY settings between “Hi”, “Low” and “Stop”. When setting a group of only free plan LOSSNAY units, you can switch between “Normal ventilation”, “Interchange ventilation” and “Automatic ventilation”.	Each Group	Each Group
External Input / Output	By using accessory cables you can set and monitor the following. Input By level: “Batch start/stop”, “Batch emergency stop” By pulse: “batch start/stop”, “Enable/disable remote controller” Output: “start/stop”, “error/Normal” ?5: Requires the external I/O cables (PAC-YG10HA-E) sold separately.	*5 Collective	*5 Collective

All Centralized Controllers shall be equipped with one RJ-45 Ethernet port to support interconnection with a network PC via a closed/direct Local Area Network (LAN).

The Centralized Controller shall be capable of performing initial settings via the keypad and display on the controller or via a PC using the Centralized Controller’s initial setting browser.

Software Centralized Controller functions shall be available so that the building manager can securely log into each via the PC's web browser to support operation monitoring, scheduling, error email, personal browser for PCs and MACs, and online maintenance diagnostics. BACnet® interface shall be available through software operating on a dedicated PC and a Centralized Controller license. The software functions shall require advance purchasing and can only be activated upon receipt of a license number from the manufacturer. These optional software functions shall be licensed for a fixed term, subject to renewal and associated fees upon term expiration.

The Graphical User Workstation Software shall require a field supplied PC.

WIRING: Contractor shall be responsible for all control wiring, power wiring, etc. required to complete the VRF system and provide to owner with an operable working system. The contractor shall furnish and install a dedicated ethernet cable system specifically for the HVAC control system. Cat. 6 network cable between centralized controllers and the main controller to be located in the building. All building areas shall be completely connected with Cat. 6 cable for complete campus communication. An I.T. data drop will be provided in the building (data drop by others) in order for this contractor to connect the control system to the internet to obtain remote communications.

The Integrated System Software shall enable the user to control multiple Centralized Controller and shall provide additional functions. The configured computer shall be capable of controlling up to forty Centralized Controllers with a maximum of 2,000 indoor units across multiple outdoor units. The software shall be required if the user wants to simultaneously control more than 1 Centralized Controllers from a single PC using a single software session. Licensing per function, per Centralized Controller shall be required for the software. These optional software features shall require the TG-2000 software, advance purchase from the customer, and licensing from the manufacturer to enable feature activation. These software functions shall be licensed for a fixed term, subject to renewal and associated fees upon term expiration.

(Integrated System Software)				
Centralized Controller License				
Item	Details	PC Monitoring	PC Scheduling	Tenant Billing
ON/OFF	The units can turn ON and OFF for all floors or in a block, floor, or group of units.		√	
Operation Modes	The operation mode can be switched between COOL, DRY, FAN, AUTO, and HEAT for all floors or in a block, floor, or group of units		√	

Temperature Setting	The room temperature can be set for all floors in a block, floor, or group of units. Set temperature range Cool/Dry: 67°F-83°F Heat: 67°F-83°F Auto: 67°F-83°F * Depends on unit type	√	
Fan Speed	The fan speed can be set to four stages for all floors or in a bloc, floor, or group of units	√	
Air Direction	The air direction can be set in four vertical directions or to swing for all floors or in block, floor, or group of units. (The selectable air direction differs according to the model.)	√	
Interlocked Unit ON/OFF LOSSNAY	If there is an interlocked unit (LOSSNAY), then the unit can be turned ON (strong/weak) or OFF for all floors or in a block, floor, or group of units. (Note that the ventilation mode cannot be selected for interlocked units.)	√	
Local Operation Prohibit	The items for which operation with the local remote controller are to be prohibited can be selected for all floors or in a block, floor, or group of units. (The items that can be prohibited are ON/OFF, operation mode, set temperature and filter sign reset.)	√	
Annual / Weekly Schedule	The annual/weekly schedule function can be used by registering the license. Two settings, such as seasonal settings for summer and winter, can be saved.	√	√
Power Rate Apportionment Charging	An RS-485 watt-hour meter (WHM) is connected to calculate the air conditioning charges based on the amount each tenant's air-conditioner has operated. Two charging rates can be applied per day.	√	√
History	Up to 3,000 items for the error history and up to 10,000 items for operation history can be saved. Each history file can be output as a daily report or monthly report in CSV format. (The operation history consists only of the operations carried out with the TG-2000 and is limited to some limited operation items.)		√

Operation Time Monitor	The cumulative operation time of each indoor unit can be viewed or output as a CSV format file. (This function is valid only when the charging function license is registered.)	√	√
Filter Sign Display Mask	The filter sign display at the remote controllers can be disabled.		√
Night Set-Back Function *1, *4	Heating from 55°F and higher can be set using the schedule.		√
Set Temperature Limit *1	The set temperature lower limit can be set for cooling and the upper limit for heating. (ME remote controller required)		√

With Night Set-Back function, the system can run at heating mode with target temperature set to 55ºF under schedule control. This function can protect the room from dropping down to extremely low temperature in the evenings.

System Integration: The CMCN shall be capable of supporting integration with Building Management Systems (BMS) via BACnet® interfaces.

BACnet® Interface: The BACnet® interface, shall be compliant with BACnet®/IP (ANSI/ASHRAE 135-1995, 135a) and UDP/IP of Ethernet (ANSI/ASHRAE 135-1995, 135b). The BACnet® interface shall require a dedicated network computer and activated BACnet® software function via issued license for a fixed term, subject to renewal and associated fees. The BACnet® software license shall be on a per unit basis for a maximum of 50 indoor units controlled by one Centralized Controller. The BACnet® interface shall support a maximum of ten Centralized Controllers for a maximum of 500 indoor units. Operation and monitoring points include, but are not limited to, on/off, operation mode, fan speed, prohibit remote controller, filter sign reset, alarm state, error code, and error address.

Power Supply: The power supply shall supply 12VDC for the centralized controller and 24VDC voltage for the central control transmission. The power supply can power a maximum of 2 centralized controllers.

INTERFACE WITH THE CAMPUS BAS:

Interface to the existing Campus Building Automation System (BAS) shall be thru BACNET, and a detailed point mapping list shall be provided to the BAS contractor for the interface programming by the BAS contractor. All control work, BACnet cards, and software required for the VRF system controls and BAS controls work, panels, programming, etc. shall be included as part of the project. The requirement of the project is to have a complete and fully commandable, monitored system, viewable and controllable from the Central Campus graphical workstation (Siemen's workstation). Contractor shall contact Barton Dupre (337-447-0481 cell or 877-473-7802 work) with Select Building Controls to complete BACnet interface connections and front end graphics modifications required for this project.

REFRIGERANT LINE SIZING:

Refrigerant lines sizes for each system shall be sized in accordance with the equipment manufacturer's sizing guide lines.

Sizing for each system shall be submitted with equipment shop drawings. The contractor will be required to install refrigerant lines in accordance with equipment manufacturer's requirements. Service stop valves with service port shall be installed on each unit (inside and outside) for servicing systems without shutting down the entire system.

TESTING REFRIGERANT PIPING SYSTEMS:

Refrigerant lines shall be tested under 600 (minimum) psi carbon dioxide pressure (or as recommended by manufacturer for refrigerant type used in each system) for 24 hours using soap suds at joints to test for leaks. Contractor shall compete a vacuum test (triple pull down test) at 1500 microns with nitrogen break, then 1000 microns with nitrogen break, then 500 microns – disconnect vacuum pump and hold vacuum for one (1) hour (maximum of 100 point rise within the 1 hour time period). If any tests fails, the contractor shall repair leak(s) and completely re-test the piping system(s) (pressure and vacuum tests). Evacuate system and properly charge with refrigerant.

LABELING A/C UNITS:

All Indoor Units, Outdoor Units, and thermostats shall be labeled with permanent laminated plate riveted to unit. Units shall be labeled as indicated in schedules and as addressed for the manufacturer's commissioning of equipment. Plate shall be black with white unit numbers. Height of unit number shall be minimum of one (1) inch. Label shall also indicate area serviced by unit as noted in schedules. Height of letters shall be minimum of one-half (1/2) inch. Height of letters for thermostats shall be 1/8". Submit sample to Engineer for approval.

PROTECTION:

HVAC Equipment, ductwork, filters, etc. Shall be clean when installed and kept clean during construction.

Provide temporary closures of metal or taped polyethylene on openings on equipment, open ductwork, vent systems, etc. during construction to prevent construction dust from entering equipment or the duct system.

Equipment and system components that are not protected shall be cleaned by the contractor at the contractor's expense prior to acceptance.

All materials stored on site during construction shall be properly covered and protected from dust, rain, etc.

Materials damaged during construction shall be replaced with new materials.

Filters in equipment shall be replaced during construction if equipment is used during the construction phase. A final clean set of filters shall be installed in equipment when the systems(s) are turned over to the Owner.

AIR DISTRIBUTION

GENERAL:

Furnish and install all ducts for Air Conditioning, Heating and Ventilating System as shown on the plans and as may be required to provide complete system. All ductwork shall be concealed and insulated as hereinafter specified. HVAC System shall be constructed in accordance with N.F.P.A. 101:9.2.

ALL DUCTWORK SIZES INDICATED ON DRAWINGS ARE METAL-TO-METAL OUTSIDE DIMENSIONS.

DUCT HANGERS AND SUPPORTS:

All ductwork shall be properly braced to prevent rattling, breathing or other unnecessary noise. No sharp edges or obstructions shall project into the air stream. Minimum duct strap support shall be 1" wide x 16 gauge.

LOW PRESSURE DUCTWORK:

All ductwork shall be galvanized steel and shall be of gauges and construction as recommended by ASHRAE Guide and Data Book. Gauges are as follows, with longest side governing. (Duct dimensions on Plans are metal-to-metal dimensions).

Dimensions of longest side:	Sheet Metal Gauge:
0" to 12"	26 Gauge
13" to 30"	24 Gauge
31" to 54"	22 Gauge
55" to 84"	20 Gauge

All ductwork shall be sealed at seams and joints with tape and hard cast duct sealant material.

Joints and reinforcing shall be as per ASHRAE Guide and Data Book, and all slips shall be installed without edge of internal part of slip facing downstream.

Construction standards of Article 110 of the National Board of Fire Underwriters, Bulletin 90, latest edition, shall apply throughout.

All ducts shall be straight and true and installed in a neat and workman-like manner.

ROUND DUCTWORK:

Outside Air Supply shall be constructed of 26 gauge galvanized sheet metal with screwed and taped joints.
At contractor's option (Outside Air Supply only), pre-insulated flexible ductwork as manufactured by Therma flex Model MKE, Flexmaster 8M or prior approved equivalent (manufacturers literature and sample will be required for prior approval) may be used to connect to ceiling diffusers (maximum 5'-0" length). Flexible ductwork shall be installed in accordance with manufacturers recommended installation instructions. Inner and outer liner shall be properly sealed and secured.

EXTERNAL DUCT INSULATION:

Outside Air ductwork:
Low pressure rectangular and round ductwork shall be wrapped on outside with 2.125" minimum thickness, 3/4# density, minimum installed R-value of R-6.0, fiberglass insulation with aluminum foil vapor barrier. Insulation shall be taped at all joints and installed per manufacturer's recommendations.

DUCTWORK SEALANT:

All Outside Air Ductwork shall be sealed air tight. All seams, both shop made, and field installed, and shall be sealed with mastic. All transverse joints shall be sealed as well as spin collar takeoffs and rough duct connections. All duct connections and seams shall be sealed with a UL approved non-flammable mastic system. Strict adherence to manufacturer’s installation instruction is required. The duct sealant shall be equal to Hardcast SURE-GRIP 404, United McGill Solvent Based Duct Sealant, or prior approved duct sealing system. All surfaces shall be rated for 25/50 Flame Spread and Smoke Development.

All ductwork shall be sealed to “Seal Class A”. Seal Class A is transverse joints and seams and wall penetrations (sensors).

PROTECTION:

HVAC Equipment, ductwork, etc. shall be clean when installed and kept clean during construction.

Provide temporary closures of metal or taped polyethylene on HVAC equipment, open ductwork, VRF Indoor units, and/or vent systems during construction to prevent construction dust from entering equipment and duct systems.

Equipment and system components that are not protected shall be cleaned by the contractor at the contractor’s expense prior to acceptance.

All materials stored on site during construction shall be properly covered and protected from dust, rain, etc.

Materials and/or equipment damaged during construction shall be replaced with new materials.

EMERGENCY DRAIN PAN:

Provide an emergency drain pan for Branch Circuit Controller(s).

The pan shall be constructed of 18 gauge galvanized steel, extending 6" beyond each individual unit all around and turning up a minimum of 4" around the perimeter and water piping inlet valves at AHU. A 1-1/4" x 1-1/4" x 1/8" galvanized angle iron frame shall be welded around the top of the pan. Entire pan should be painted with black asphalt rust preventative paint. Extend a drain line (minimum 1") to the nearest condensate drain line.

TEMPERATURE CONTROLS

GENERAL:

Provide an electric temperature control system by Equipment Manufacturer, to be installed by the Mechanical Contractor.

Control work associated with the connection to the existing campus EMS/BAS shall be the responsibility of the Contractor.

Interface to the existing Campus Building Automation System (BAS) shall be thru BACNET, and a detailed point mapping list shall be provided to the BAS contractor for the interface programming by the BAS contractor. All control work, BACnet cards, and software required for the VRF system controls and BAS controls work, panels, programming, etc. shall be included as part of the project. The requirement of the project is to have a complete and fully commandable, monitored system, viewable and controllable from the existing Central Campus graphical workstation (Siemen’s workstation) in Parker Hall. Contractor shall contact Barton Dupre with Select Building Controls (SBC)(337-447-0481, barton_dupre@w-industries.com) for all BACnet integration, graphic modifications, etc. associated with the connection to the existing campus workstation. All work by this contractor and SBC shall be included as part of this project.

The Contractor shall be responsible for installing wiring for the VRF equipment controls system. All work shall be coordinated with the Owner prior to installation.

CONTROL WIRING:

All wiring required in the control systems, including electrical connections for the thermostats, fire-stats, and all interlocking motor control wiring shall be furnished and installed by Mechanical Contractor.

All wiring shall be in conduit and in accordance with the National Electrical Code (N.E.C.).

All control wiring located outdoors shall be installed in rigid or intermediate metal conduit.

All control wiring located indoors where an accessible ceiling is not available shall be installed in E.M.T. conduit.

All control wiring located above accessible ceilings shall be N.E.C. approved cable. All control wiring located above accessible ceilings used as air plenums shall be N.E.C. approved "plenum cable".

All wiring for the VRF equipment shall be wiring as recommended by the equipment manufacturer.

All conductors shall be copper. Conductors used for power circuits shall be #12 TW minimum. Conductors used for control circuits shall be #18 TW (single strand) minimum. Conductors used for sensor circuits shall be #18 TW (single strand) minimum. Control wiring for DX equipment thermostats shall be 10 conductor cables.

TESTING, ADJUSTING AND BALANCING

(N/A)

ELECTRICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions as appropriate, apply to the Work specified in this Section.

B. Refer to all Electrical Specifications as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding electrical work.

1.2 BIDDING REQUIREMENTS AND RESPONSIBILITIES

A. Prime bidder is responsible for all work, of all trades and sub-contractors bidding this project. It is the prime bidder's responsibility, prior to submitting a bid to ensure that subcontractors coordinate all aspects of the work between trades, sub-contractors, etc. to the fullest extent possible.

B. Prime bidder shall ensure that all sub-contractors, suppliers, equipment vendors, etc., obtain all necessary and pertinent contract document information pertaining to their work prior to the submission of a bid. Contractor shall realize that different sub-contractors may furnish equipment, accessories, devices, etc. necessary for a complete and working installation, that require provision of services by another sub-contractor or trade.

C. Bidders of all or any portions of this section or division are required to review all contract documents to coordinate requirements and responsibilities with and through prime bidder.

D. Bidders of all or any portions of this section or division, by furnishing a bid on a portion of the prime contract are indicating that they have received all contract documents and coordinated services provided under their portion of the work with the prime bidder; they are indicating that they have expressed any pertinent questions (which would result from a detailed, thorough review of the entire set of contract documents) to the prime bidder in accordance with the general provisions of the Specifications requirements, prior to bidding.

E. All timely, pertinent, questions provided in writing prior to bids, in accordance with the general provisions of the Specifications requirements, will be clarified, defined, or otherwise explained in a written addendum and/or addendums prior to bids, in accordance with the general provisions of the Specifications requirements.

F. It is not the intention of these contract documents to leave any issue relating to coordination between trades or sub-contractors vaguely defined. The intention is to define all issues, coordination matters, equipment requirements, sizes, routing, etc. to the satisfaction of the prime bidder, prior to receipt of bids.

G. Bidders of all or any portions of this section or division, by virtue of the submission of a bid to the prime bidder, are indicating that they have reviewed the entire set of contract documents with due diligence and regard for the Owner's desire for a comprehensive and complete bid proposal; that they have expressed all concerns or questions requiring clarification on matters of coordination between trades and/or sub-contractors; that they have expressed any such concerns or questions in writing in accordance with contract document's General Provisions requirements.

H. Prime bidders, by submission of a comprehensive bid on the project are indicating that the subcontractors selected in their bid have complied with all contract document's General Provisions requirements, that they have indicated in writing, prior to bidding, all questions or concerns requiring clarification and/or explanation and have documented any and all specific exclusions involving work that would generally be considered to be work of their trade. The prime bidder shall coordinate all work so that anything excluded by the bidder of all or any portions of this section or division, have been addressed prior to bids in one of the following manners:

1. The work has been confirmed, by the prime bidder, to be work of another trade or subcontractor whose proposal is also being accepted.

2. Clarification of the matter has been made through the prime design professional via written addendum and is clearly and mutually understood by the prime bidder and the party raising the issue/question, or seeking clarification.
3. The work has been accepted as the responsibility of the prime contractor directly.

1.3 MATERIAL AND EQUIPMENT

A. The term "provide" when used in the Contract Documents includes all items necessary for the proper execution and completion of the work.

B. Specific reference in the Specifications to any article, device, product, material, fixture, form or type of construction by name, make or catalog number, shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition; and the Contractor, in such cases, may at his option use any article, device, product, material, fixture, form or type of construction which in the judgement of the Architect expressed in writing is equivalent to that specified.

C. Coordinate and properly relate all work of this Division to building structure and work of all other trades.

D. Visit premises and become thoroughly familiar with existing conditions; verify all dimensions in field. Advise Owner of any discrepancies prior to Bid Date in accordance with contract document's General Provisions.

E. Do not rough-in for any item or equipment furnished by others or noted "Not in Contract" (NIC), without first receiving rough-in information or determining rough-in requirements from other trades and/or Architect.

F. Provide storage and protection for all equipment and materials in accordance with requirements of contract document's General Provisions. Replace any equipment and materials damaged by improper handling, storage, or protection, at no additional cost to the Owner.

G. Keep premises clean in accordance with requirements of contract document's General Provisions.

1.4 SUBSTITUTIONS

A. Substitutions are allowed under La. R.S. 38:2291 and La R.S. 38:2292. Any requests for prior approval (as provided for under La. R.S. 38:2295) including any re-submitted data, shall be received by the Architect/Engineer a minimum of ten (10) working days prior to bid date. Submittals sent via facsimile and/or electronic mail will not be accepted. The Contractor shall recognize that it may be necessary to submit certain requests for prior approval sooner than the final date listed in the Instructions to Bidders, depending upon the complexity and completeness of the submittal. If, in the opinion of the Owner, there is neither sufficient time available nor adequate descriptive data attached to the submittal, the submittal will not be considered. Except as otherwise specified, materials and equipment shall be new and bear the approval label of the Underwriters Laboratories, Inc. for the type of installation required.

B. Basis of design of systems is based on specific equipment for performance, size, shape, color, construction material, etc... If the use of other manufacturer's equipment, even though approved by Architect, involves additional cost due to space requirements, foundation requirements, increased mechanical or electrical services, the cost of such extra work shall be borne by the contractor. Even though a manufacturer's name

appears in the Contract Documents as having acceptable equipment, his equipment shall be classified as being a substitute to the equipment originally designed for and named in the Contract Documents. Substitute equipment, materials, etc., will not be allowed to deviate from basis of design requirements.

C. All requests for prior approval shall identify where proposed material matches or exceeds the performance of the equipment specified. In addition, such submittal shall also clearly identify all deficiencies compared to specified product. Submittal of general cut sheets will be returned rejected.

1.5 DRAWINGS AND SPECIFICATIONS

A. The specific intent of these Contract Documents is to provide the various systems, equipment, etc. to the Owner complete and in a thoroughly calibrated and functional condition.

B. The Drawings shall not be construed as shop drawings. In the event of a possible interference with piping or equipment of another trade, items requiring set grade and elevations shall have precedence over other items. Should any major interference develop, immediately notify the Owner.

C. In laying out Work, refer to drawings at all times in order to avoid interference and undue delays in the progress of the Work.

1.6 CODES AND REGULATIONS

A. Work shall be in full accord with the LA State Sanitary Code, 2014 N.E.C. (NFPA 70), local ordinances, building codes, and other applicable national, state, and local regulations.

B. Equipment shall conform to requirements and recommendations of the National Bureau of Fire Underwriters and National Fire Protection Association (NFPA).

C. Items provided under this Division shall comply with the American National Standards Institute (ANSI) "Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People," ANSI A 117.1, and the Americans with Disabilities Act (A.D.A.).

D. Work called for in these Plans and Specifications shall be executed by competent workmen.

E. In the possible event of conflict between codes or regulations and Contract Documents, notify the Architect/Engineer immediately.

F. The drawings show approximate locations only of feeders, branch circuits, outlets, etc., except where specific routing or dimensions are indicated. The Owner reserves the right to make reasonable changes in locations indicated, before roughing-in, without additional cost to the Owner.

G. Because of the small scale of the drawings, it is not possible to indicate all of the offsets, fittings, and accessories required. The Contractor shall investigate the structural and finish conditions affecting his work and shall arrange such work accordingly, fittings, bends, junction boxes, pull boxes, access panels, and accessories required to meet such conditions at no additional costs to the Owner.

1.7 FEES, PERMITS, AND TAXES

A. Obtain and pay for permits required for the Work of this Division. Pay fees in connection therewith, including necessary inspection fees.

B. Pay any and all taxes levied for Work of this Division, including municipal and/or state sales tax where applicable.

1.8 MANUFACTURER'S DIRECTIONS

A. Install and operate equipment and material in strict accord with manufacturer's installation and operating instructions. The manufacturer's instructions shall become part of the Contract Documents and shall supplement Drawings and Specifications.

1.9 SUBMITTAL DATA

A. Submit shop drawings, project data, and samples in accordance with requirements of the General Provisions of the contract documents. Submittals shall be received no later than thirty (30) consecutive calendar days from effective date of “Notice to Proceed”.

B. Shop drawings shall consist of published ratings or capacity data, detailed construction drawings for fabricated items, wiring and control diagrams, performance curves, installation instructions, manufacturer's installation drawings, and other pertinent data. Submit drawings showing revisions to equipment layouts due to use of alternate or substitute equipment.

C. Where manufacturers and suppliers of equipment, materials, etc. are unable to fully comply with Contract Document basis of design requirements, specifically call such deviations to attention of Architect/Engineer on submittals. Typed deviations on a separate sheet; underlined statements or notations on standard brochures, equipment fly sheets, etc. will not be accepted. Submittals shall clearly indicate where material submitted meets and/or exceeds the performance criteria of the equipment used as the basis of design of the project. Failure to note compliance with the basis of design material/equipment shall result in rejection of submittals.

D. Approval of submittals shall not relieve Contractor from furnishing required quantities and verifying dimensions. In addition, approval shall not waive original intent of Contract Documents.

E. Failure to obtain written approval of equipment shall be considered sufficient grounds for rejection of said equipment regardless of the stage of completion of the project.

F. Contractor shall submit Submittals/Shop Drawings on all equipment listed below. In addition, contractor shall refer to subsequent sections of the Electrical portion of the specifications for additional shop drawing submittal requirements.

1. Toggle Switches
2. Wiring Device Box Support Brackets
3. Wire

G. Shop Drawings/submittals shall be submitted in individual books as grouped together and stated below and shall be submitted simultaneously. Electrical gear shop drawings shall not be submitted until approval is obtained for all HVAC equipment. Prior to submission of electrical gear shop drawings, contractor shall obtain a copy of the approved mechanical and plumbing submittals. Any modifications required to be made to the electrical gear due to changes in electrical requirements (increases and/or decreases) of the mechanical equipment shall be clearly notated in the electrical gear submittals.

1. Toggle Switches, Device Box Support Brackets, Pull Boxes, and Wire.

1.10 PROJECT COORDINATION

A. Refer to applicable Electrical Specification Sections for products work of this Division.

B. Refer to all mechanical specifications sections for related products affecting work of these electrical sections.

C. Coordinate handling of all products, materials, etc., through the Contractor. Coordinate space, access, clearances, etc., through the Contractor prior to preparation of shop drawing submittal.

D. The Contractor is herein cautioned to note that the work involved is a complicated renovation and a new addition project requiring continuous owner occupancy. The Contractor should review the phasing plans/descriptions and visit the project site to determine existing conditions. The Contractor will be held responsible for allowing for these conditions in his bid.

1.11 SERVICE CONTINUITY

A. At all times during the construction of the project, electric service shall be maintained to all portions of the site and existing facility, except with prior written approval from the Owner of interruptions. It shall be the responsibility of the contractor to provide, install and maintain (fuel included) any required rental generators to accomplish said task. Any required interruptions of electric service due to work being performed under this Contract shall be scheduled in writing a minimum of forty-eight (48) hours in advance after consultation with the Owner and shall occur when permitted by the Owner. The Contractor shall be responsible for any overtime pay required to meet these requirements, at no additional cost to the Owner.

1.12 VALUE ENGINEERING (V/E):

A. While it may be in the Owner's interest to consider the first cost money saving that may be generated via alternatives and options generated via participation in Value Engineering, contractor shall realize that substantive offers of Value Engineering (V/E), if accepted by the Owner, constitute a design-build agreement (offer and acceptance) with the owner, and drastically change the design concept of the project, as developed by the Professional of Record identified on the Contract Documents.

B. Should contractor offer, and the owner accept value engineering options that alter aspects of the system design, equipment, performance and/or performance verification or monitoring of respective systems, the contractor shall provide duly licensed professional engineering consultants working on behalf of the contractor (including sub-contractors and equipment vendors/manufacturers) to review, approve and take

professional responsibility for performance and suitability of V/E hybrid systems, materials or operational changes related to respective V/E items. The contractor's licensed professional engineering consultants and the contractor assume any and all responsibility for the design and suitability in terms of performance, of hybrid systems installed, as contractor's Professional of Record, absolving the original project Professional of Record (identified on the original Contract Documents, released for the original project Bid/Negotiation) from responsibility for the V/E hybrid systems portion of the work.

C. The contractor, via the offer and acceptance of value engineering items on the project agrees to provide professional engineering design services and take full and complete responsibility for the hybrid design. Further, the contractor's (V/E Items) professional of record (either employees, or independent consultants to the contractor) through the offer and acceptance of V/E items, agree to indemnify and hold harmless the project owner, the owner's original A/E team (Professional of Record on behalf of the owner for the original Contract Documents) their heirs and assigns in regard to the V/E changes and their impact on the systems altered, affected or modified, in whole or in part. The Professional of Record shown on the original Contract Documents in regard to the systems altered, adjusted, revised, modified or otherwise affected by the value engineering items implemented, shall be absolved of design responsibility as a result of implementation of V/E items, and their original use of Engineering Seals used for original Contract Documents, shall not apply.

1.13 PROJECT RECORD DOCUMENTS

A. Keep Project Record Documents in accordance with general provision requirements of the specifications.

B. During construction period, keep accurate records of installations paying particular attention to major interior and exterior underground and concealed piping, ductwork, etc.

C. The Contractor shall obtain a minimum of one (1) set of the contract documents including all addenda and change orders as prepared by the Owner.

D. If the Contractor elects to vary from the Contract Documents and secures prior approval from the Owner for any phase of the work, he shall record in a neat and readable manner all such variances on the contract documents in red ink. Prior to requesting substantial completion the marked-up set of contract documents shall be returned to the Owner for approval.

E. All deviations from sizes, locations and from all other features of the installation shown in the Contract Documents shall be recorded.

F. In addition, it shall be possible using these drawings to correctly and easily locate, identify and establish sizes of all piping, directions, and the like, as well as other features of work which will be concealed underground and/or in the finished building.

G. Locations of underground work shall be established by dimensions to columns, lines or walls, locating all turns, etc. and by properly referenced centerline or invert elevations and rates of fall.

H. For work concealed in the building, sufficient information shall be given so it can be located with reasonable accuracy and ease. In some cases this may be by dimension. In others, it may be sufficient to illustrate the work on the drawings in relation to the spaces in the building near which it was actually installed. The decision of the Owner in this matter will be final.

I. The following requirements apply to all Record Drawings:

1. They shall be maintained at the Contractor's expense.
2. All such drawings shall be done carefully and neatly.
3. Additional drawings shall be obtained at the Contractor's expense.
4. They shall be kept up-to-date during the entire course of the work and shall be available upon request for examination by the Owner and when necessary, by other trades, to establish clearances for other parts of the work.
5. Record Drawings shall be returned to the Owner upon completion of the work and are subject to approval of the Owner.

1.14 OPERATION AND MAINTENANCE DATA

A. Refer to the specification Sections related to PROJECT CLOSEOUT or OPERATION AND MAINTENANCE DATA for procedures and requirements for preparation and submittal of maintenance manuals.

B. Provide the Owner with three (3) copies of printed instructions indicating various pieces of equipment by name and model number, complete with parts lists, maintenance and repair instructions and test and balance report.

C. COPIES OF SHOP DRAWINGS WILL NOT BE ACCEPTABLE AS OPERATION AND MAINTENANCE INSTRUCTIONS.

D. This information shall be bound in plastic hardbound notebooks with the job name, Owner name permanently embossed on the cover. Rigid board dividers with labeled tabs shall be provided for different pieces of equipment. Submit manuals to the Owner for approval.

E. In addition to the operation and maintenance brochure, the Contractor shall provide a separate brochure which shall include registered warranty certificates on all equipment, especially any pieces of equipment which carry warranties exceeding one (1) year.

F. As part of the O & M binders, contractor shall include copies of all studies and test reports performed as part of this project, including but not limited to, the following:

1. Acceptance Testing Reports
   a. Thermographic Tests
   b. Torque Values
   c. Rotation Tests

G. The operation and maintenance brochure shall be furnished with a detailed list of all equipment furnished to the project, including the serial number and all pertinent nameplate data such as voltage, amperage draw, recommended fuse size, rpm, etc. The Contractor shall include this data on each piece of equipment furnished under this contract including but not limited to those items listed below.

1. Toggle Switches
2. Wiring Device Box Support Brackets
3. Data System components

4. Cover Plates
5. Wire

1.15 CUTTING AND PATCHING

A. Comply with requirements of the Specifications regarding cutting and patching. Locate and timely install sleeves as required to minimize cutting and patching.

B. Cutting, fitting, repairing, patching, and finishing of Work shall be done by craftsmen skilled in their respective trades. Where cutting is required, cut in such a manner as not to weaken structure, partitions, or floors. Holes required to be cut must be cut or drilled without breaking out around the holes. Where patching is necessary in finished areas of the building, the Owner will determine the extent of such patching and refinishing.

C. Repairing Roadways and Walks: Where this contractor cuts or breaks roadways or walks to lay the piping, he shall repair or replace these sections to match existing, unless specifically identified as the responsibility of others.

1.16 PAINTING

A. Painting shall be provided under the Specification section regarding painting, unless specified otherwise. Leave exposed piping, materials, and equipment clean and free of rust, grease, dirt, etc. before and after painting.

B. Factory finished equipment, fixtures, and materials which are marred, chipped, scratched, or otherwise unacceptable shall be repaired or replaced under this Division to Owner satisfaction, at no additional cost to Owner.

C. Coordinate all painting requirements with prime bidder prior to bids.

D. All exposed conduit, materials, hangers, anchors, etc., are to be primed and painted. Color shall match adjacent surfaces where not specifically designated otherwise. All galvanized materials shall be suitably treated prior to painting to ensure adhesion.

1.17 EXISTING CONDITIONS

A. The Electrical Contractor shall visit the building site to determine existing conditions and will be held responsible for allowing for these conditions in his bid.

B. Note that this area of work will have storm drainage, mechanical and electrical utilities located underground and within and under the buildings. It is part of this work for the Contractor to determine the scope and location of all utilities to be installed with this project and arrange his work around others. There will be no extra consideration for work discovered as being hidden after the bid, and no change orders for extra cost that may be caused by unknown after bid conditions. The drawings show approximate locations only of

feeders, branch circuits, outlets, etc., except where specific routing or dimensions are indicated. The Owner reserves the right to make reasonable changes in locations indicated, before roughing-in, without additional cost to the Owner.

1.18 PROTECTION OF APPARATUS

A. The Contractor shall take precautions necessary at all times to properly protect his apparatus from damage. Failure on the part of the Contractor to comply with the above to the Owner's satisfaction shall be sufficient cause for the rejection of the particular piece of apparatus in question.

1.19 MINOR DEVIATIONS

A. The Contractor shall realize that the drawings cannot delve into every step, sequence, or operation necessary for the completion of the project without drawing on the Contractor's experience. Only typical details are shown on the plans. In cases where the Contractor is not certain about the method of installation of his work, he shall ask for details. Lack of details will not be an excuse for improper installation.

1.20 SALVAGED MATERIALS

A. The Owner shall have priority for the selection of salvaged material and equipment. Any equipment, light fixtures, devices, ballasts, materials, etc. selected to remain property of the Owner shall be removed and delivered to a location on the site as designated by the Owner. Material and equipment not retained by the Owner shall become the property of this Contractor and shall be removed from the site by him.

B. The Contractor shall obtain written approval of all material and equipment determined not to be salvaged by the Owner.

1.21 SAFETY PRECAUTIONS

A. Work methods and project safety are the Contractor's sole responsibility.

B. Contractor shall furnish and place proper guards for prevention of accidents. He should provide and maintain any other necessary construction required to secure safety of life or property, including maintenance of sufficient lights during all day and night hours as required to secure such protection.

C. Temporary electrical services during construction should be maintained in perfect condition. Frayed, lose or opened connections should not be used for temporary services. The Contractor should use only equipment in first class working condition for construction services.

1.22 SUPERVISION

A. Contractor shall personally, or through an authorized and competent representative, constantly supervise the work done from beginning to completion and final acceptance. To the best of his ability he shall keep the same foreman and workmen throughout the project duration. Foreman shall be present at project site at all times while work under this section of the contract documents is being performed. Foreman shall be

accessible by cellular phone at all times. Respective telephone numbers shall be forwarded to Owner prior to commencement of work on this project.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Motor Rated Switches shown on the drawings and furnished and/or installed under this section of the Specifications shall be labeled with laminated plastic nameplates inscribed to identify equipment with description shown on the drawings for panels, the name of the equipment controlled for motor starters or the system or function involved for other equipment.

PART 3 - EXECUTION

3.1 COORDINATION OF TRADES

A. Where work is in close proximity to the work of other contractors, the Contractor shall review plans of other contractors and coordinate his work with theirs. The Electrical Contractor shall verify the location of lighting fixtures, beams, structural members, conduit, ductwork, pipes or other obstructions before beginning his work in the area. Notify the Owner where proper clearances do not occur or where the work of others would interfere with the safe and/or proper operation of this work.

3.2 SUPPORTS AND FOUNDATIONS

A. Support all items covered by this Specification directly from building structural members independent of any ceilings or any other installed item. Switches may be attached to suitably reinforced walls.

B. Do not attach items of this Specification to HVAC ductwork, ceiling grids and ceiling support members, piping or other equipment unless specifically shown otherwise. Where applicable, all equipment including conduit shall be supported from overhead structures using galvanized channel for a rigid support. Position supports and equipment such that access through lay-in ceilings or panels is not impaired and all Code required clearances are maintained.

C. Where applicable, under no circumstances is the Contractor to attach to or support from any bar joist bridging. Any supports to the bar joists or any structural systems shall be approved by the Owner. All supplemental angle or channel iron required to support equipment of this Specification shall be furnished by the Electrical Contractor.

3.4 EQUIPMENT LAYOUT

A. The physical location and arrangements of electrical equipment is shown on the Plans and is to be used by the Contractor as a guideline in construction. It is the responsibility of the Contractor to review the Plans with the proposed equipment and equipment of other contractors that are affected, and to ensure that all Code required clearances, wiring distances and maintenance accesses, including equipment heights, of all items are maintained. Alternate arrangements to accomplish the above due to

field conditions or changes in physical size of the equipment proposed for the project are to be submitted to the Owner for review before any work is begun or equipment ordered.

3.5 GUARANTEE

A. The Contractor shall guarantee all materials, equipment and workmanship for a period of one (1) year from the date of final acceptance of the project. This guarantee shall include furnishing of all labor and material necessary to make any repairs, adjustments or replacement of any equipment, parts, etc. necessary to restore the project to first class condition. This guarantee shall include the replacement of lamps. Warranties exceeding one (1) year are hereinafter specified with individual pieces of equipment.

B. If the Contractor's office is in excess of a fifty (50) mile radius of the project, he shall appoint a local qualified contractor to perform any emergency repairs or adjustments required during the guarantee period. The name of the contractor appointed to provide emergency services shall be submitted to the Owner for approval.

3.6 CLEANING

A. Refer to the Specification Section relating to PROJECT CLOSEOUT or FINAL CLEANING for general requirements for final cleaning.

END OF SECTION

BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions; as appropriate, apply to the work specified in this section.

B. Refer to all portions of the Contract Documents as well as the plans and specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding electrical work.

PART 2 - PRODUCTS

2.1 WIRE (600 VOLT AND BELOW)

A. All conductors used in the work shall be soft drawn annealed copper having a composition of not less than 98% of pure copper. Conductors shall be standard code gauge in size, insulated, and shall have insulation rated for use at 600 volts. The contractor's bid shall reflect the use of all copper conductors. When aluminum conductors are used as part of the V.E. process, their use shall be limited to circuits, feeders and services rated 200 Amperes and larger and shall be of the high alloy, compact stranded type, Southwire SIM pull THHN, SIM pull THWN or equivalent. It shall be the contractor's responsibility for properly upsizing the conductors and associated conduit to achieve the equivalent ampere rating of the circuit/feeder/service as specified for copper conductors.

B. Unless otherwise noted or specified, insulation shall be Type THWN. Wires shall be of the single conductor type and shall be stranded. Wire insulation shall not contain any asbestos materials.

C. Wire #8 AWG and smaller may be type MC-cable.

D. Throughout the system, conductors shall be identified as to phase and voltage of system by color-coding. Color-coding shall be continuous the full length of wire for all wire sizes. Identification by permanent paint bands or tags at outlets will not be acceptable. Surface printing at regular intervals on all conductors shall indicate manufacturer, size, voltage, and insulation type. White and/or gray colored insulation shall be used for grounded conductors and only for grounded conductors.

E. The color code assigned to each phase wire shall be consistently followed throughout the project. The following systems of color-coding shall be strictly adhered to:

1. 208/120 V Systems
   a. Grounding leads green
   b. Grounded neutral leads white
   c. Ungrounded phase wires black, red and blue

2. 277/480 V Systems
   a. Grounding leads green
   b. Grounded neutral leads gray
   c. Grounded phase wires brown, orange, yellow

F. Where multiple neutral conductors are installed in a common raceway, the neutral conductor for each circuit shall be separately identified in accordance with the National Electric Code (NEC).

2.2 CONDUIT

A. Unless otherwise specified or shown on the drawings, all conduit shall be electrical metallic tubing (EMT).

B. All conduit shall be new and shall bear the inspection label of the Underwriters Laboratories, Inc. (U.L.).

C. Fittings for EMT shall be hot-dipped galvanized and shall be of an approved type specially designed and manufactured for their purpose.

D. All flexible conduit, where installed indoors and outdoors, shall be of the flexible liquid tight metallic type. Flexible weatherproof electrical conduit is prohibited from use on this project.

E. Metallic conduit shall be metallized, sheradized, or hot-dipped galvanized.

F. Where conduit is installed exposed in finished spaces (excluding mechanical, equipment and electrical rooms), conduit shall be painted to match adjacent surfaces (color as selected by the Architect/Engineer). All fittings, couplings, boxes, covers, etc. shall match color of conduit. Color of conduit shall comply with color code noted below.

Power and Lighting - Non-Emergency	Standard Conduit Finish
Power and Lighting - Emergency	Yellow with Black Lettering - Lettering to Denote branch of emergency power system (Life Safety or Equipment)
Tele/Data/CATV	Green
Security/CCTV	Purple

2.3 METAL-CLAD CABLE (600 VOLTS AND BELOW)

A. Where permitted by NEC and local codes and ordinances, metal-clad (MC) cables may be used in lieu of conduit and wiring specified elsewhere herein.

B. Installation of MC cables shall be in compliance with the National Electric Code (NEC).

C. Conductors shall be soft-drawn annealed copper having a composition of not less than 98% of pure copper.

D. Conductors shall be solid -type, standard Code gauge in size, insulated, and shall be rated for use at 600 volts or below. Minimum size shall be No. 12.

E. Conductor insulation shall be of a type listed in the NEC and be rated for 75 deg. C (167 deg. F) as a minimum and shall be of a type approved for use in MC cable.

2.4 EXPANSION FITTINGS

A. Each conduit that is buried in or rigidly secured to the building construction on opposite sides of a building expansion joint and each long run of exposed conduit that may be subject to excessive stresses shall be provided with an expansion fitting. Expansion fittings shall be made of hot-dipped galvanized malleable iron and shall have a factory installed packing, which will prevent the entrance of water, a pressure ring, and a grounding ring

B. In addition to the grounding ring, a separate grounding conductor shall be provided. This grounding conductor shall be an external flexible copper ground securely bonded by approved grounding straps on each end of the fitting. Grounding conductor may be omitted when expansion fitting includes an approved integral grounding conductor or device.

C. Where conduits are buried in concrete, they shall cross the building expansion joints at right angles. Ends of conduit shall be provided with insulated bushings.

2.5 OUTLET BOXES

A. Outlet boxes in concealed conduit systems shall be flush mounted. Boxes shall be galvanized steel of sufficient size to accommodate devices shown and shall have raised covers. Requirements of the NEC shall be minimum.

B. Boxes for lighting fixtures shall be four inch (4") octagon, not less than 1-1/2" deep. Where boxes are installed in concrete, boxes designed for this application shall be used.

C. Outlet boxes for switches and receptacles in concealed work shall be 4" square, and not less than 1-1/2" deep. Flush mounted outlet boxes shall be installed with plaster rings.

D. Outlet boxes for switches and receptacles installed in exposed conduit system shall be cast iron or cast aluminum Type FD or approved equivalent.

E. Where multiple outlet boxes are shown to be installed at the same location, they shall be installed using B-Line Series BB8 mounting bracket or approved equivalent. Where single boxes are shown to be installed, the B-Line Series BB2 mounting bracket or approved equivalent shall be used.

F. Outlet boxes for adjacent rooms shall not be installed in the same stud space to minimize sound transmission.

G. Outlet boxes used for lighting toggle switches shall have outlet box stabilizer(s) installed.

2.6 PULL BOXES

A. Furnish and install pull boxes. Boxes shall be code gauge galvanized steel with screw attached access panels unless noted otherwise in top, side or bottom as required.

2.7 OUTLET COVER PLATES

A. Unless otherwise noted, all outlets including telephone outlets, television outlets, computer outlets, etc. shall be fitted with cover plates of the type indicated below.

B. Cover plates shall be uniform in design and finish for switches, receptacles, and other outlets requiring cover plates. Plates shall be one (1) piece of the required number of gangs. Sectional plates shall not be used.

C. Cover plates shall be smooth plastic with gray, white, black, brown or ivory finish. Color shall be selected by the Architect/Engineer to suit the wall finish.

D. Provide blank cover plates for all un-used/empty device boxes including, but not limited to tele/data, CATV, access controls, etc....boxes.

2.8 WIRING DEVICES

A. Wiring devices shall be as listed in the following table, except that color of device shall match color of outlet cover plate.

1. Leviton / Hubbell (or equivalent by Pass and Seymour)
   Single Pole-20A (CS120-2 / CS120)
   Toggle Switch

   20A 125V 2P 3W Duplex (CR020 / CR020)
   Smooth Face
   Grounded Receptacle

   20A 125V 2P 3W Duplex (7899 / GFR5352)
   GFCI Receptacles

   20A 250V 2P 3W (5823 / HBL5461)
   Grounded Receptacle

   Switch with (120V)1221-PLR / HBL-1221PL
   Pilot Light (277V)1222-7PLR /HBL-1221-PL

PART 3 - EXECUTION

3.1 MOUNTING HEIGHTS

A. Unless otherwise noted on the drawings or required by the Owner, the mounting heights set forth below shall apply. Dimensions given are from finished floor to the centerline of the device.

1.	Intercom Staff Stations	4'-0"
2.	Toggle Switches	4'-0"
3.	Receptacles	1'-6"
4.	Panelboards	6'-7" to top of can
5.	Tele/Data Outlets	1'-6"
6.	Fire Alarm Audio/Visual	6" from ceiling on wall *
7.	Fire Alarm Hand Stations	4'-0"
8.	Fire Alarm Visual Only	6" from ceiling on wall *

* Mounting height shall be 6" from ceiling or maximum 80" above finished floor, whichever is lowest.

3.2 WIRE (600 VOLT AND BELOW)

A. Service entrance, feeders, and motor circuit conductors shall be run their entire length without joints or splices. Splices and joints in branch circuit wiring shall be only at outlets or in accessible junction boxes.

B. Joints and splices in branch circuit wiring shall be made with compression type solderless connectors. Connectors of the nonmetallic screw on type are not acceptable.

C. Terminations or splices for conductors # 6 AWG and larger shall utilize Burndy Unitap, Polaris Black or equivalent connectors.

D. Unless otherwise specified, all wiring shall be installed in conduit.

E. No wire shall be smaller than No. 12 for power or lighting service, fixture whips or for switch legs. Wire for each branch circuit shall be of a single size and type from the branch circuit protective device to the last outlet on the circuit unless noted otherwise.

F. Not more than three (3) branch circuits shall be installed in a raceway for three-phase electrical systems. For single phase electrical systems, the number of circuits in any one raceway shall be limited to two (2).

G. Branch circuits shall have a 200% rated neutral where more than one (1) branch circuit is in a raceway and the neutral conductor is shared. The neutral should match the branch phase wire size when only one (1) circuit is in a raceway and when the neutral conductor is not shared. Refer to the "Multiple Circuit Neutral Wiring Diagram." Provide multi-pole breakers to simultaneously trip all phase conductors for shared neutral circuits.

H. Type THWN conductors may be connected directly to recessed fixtures only when the fixtures are equipped with outlet boxes approved by Underwriters Laboratories, Inc. for use with wires having insulation rated for maximum operating temperature of 75o C., (167o F.); otherwise, conductors with Type SF2 insulation shall be run from fixture terminal connections to an outlet box placed at least one foot (1') from the fixture, such a tap shall extend for at least four feet (4'), but not more than six feet (6'), in flexible metal conduit.

I. Branch circuit home run numbers shown on the drawings shall be used for connection of circuit wiring to similarly numbered protective devices in branch circuit panelboards.

J. Where the length of a home run, from panel to the first outlet exceeds 75 feet (75') for 120 volt circuits or 175 feet (175') for 277 volt circuits, the conductor size shall be No. 10 AWG or that shown on the drawings, whichever is larger.

K. For all 3-phase circuits, contractor shall provide and install a full size neutral conductor and a grounding conductor for a complete 5-wire circuit. If the neutral conductor is not required by the equipment, contractor shall install wire nuts on each end of the neutral conductor for future use.

3.3 CONDUIT

A. Couplings and connectors for EMT shall be compression type or cast iron set screw type.

B. Where conduits enter boxes or cabinets that do not have threaded hubs the conduit shall be secured in place with galvanized locknuts inside and outside and shall have bushings inside for interior locations. Conduits larger than one inch (1") shall have galvanized insulating bushings.

C. All conduits shall be installed as indicated or scheduled on the drawings and shall be of sufficient size to accommodate the required number of insulated conductors including equipment-grounding conductor. A

grounding conductor shall be pulled in every raceway and properly terminated. The Contractor shall increase the conduit size from that shown on the drawings where necessary to accommodate the equipment-grounding conductor and/or where to comply with the NEC.

D. Unless otherwise noted, conduit shall be run concealed. Conduit runs from wall mounted receptacles, toggle switches, etc. shall be run concealed in walls whenever possible.

E. Conduit runs shall be straight; elbows and bends shall be uniform, symmetrical, and free from dents or flattening. All conduit shall be installed with runs parallel or perpendicular to walls, ceilings and structural members.

F. Conduit shall not be run nearer than three inches (3") to hot water or steam pipes except where crossings are unavoidable. Conduit shall be kept at least one inch (1") from covering of pipe crossed and the conductor size shall be increased one (1) size

G. Conduit shall be held securely in place by approved hangers and fasteners of appropriate design and dimensions for the particular application. Support shall be such that no strain will be transmitted to the outlet box and/or pull box supports. Conduit shall be secured only to the building structure.

H. All conduit runs shall be installed in accordance with all applicable sections of the National Electrical Code and local codes or ordinances.

I. Where empty conduits are shown, a #14 pull wire shall be installed and conduits shall be capped.

J. Terminations to all mechanical equipment and to all dry-type transformers shall be made using a minimum of 12" to a maximum of 24" liquid-tight flexible metallic conduit.

K. At each concealed junction box in the power and lighting system, identify the panel and circuit number(s) contained in the junction box by writing in permanent marker on the outside of the junction box cover.

L. Where conduits are run from condition spaces to/thru un-conditioned spaces, the ends of the conduits shall be sealed (after conductor installation) to prevent the transmission of air from non-conditioned spaces in to the conditioned spaces. Expanding spray foam and EYS seals are approved methods of sealing conduits.

M. For all surface mounted devices, including fire alarm, intercom and nurse call systems, device boxes shall be Wiremold No. R5752 and R5753 or approved equivalent style boxes sized such that device does not overhang edge(s) of back box. Color of box shall match device.

3.4 METAL-CLAD CABLE (600 VOLTS AND BELOW)

A. The metallic sheath shall be galvanized steel or aluminum corrugated sheath type and shall be terminated at outlet boxes, cabinets, etc. with fittings specifically approved for such use, which shall properly ground the metallic sheath.

B. Each metal-clad cable assembly shall have one (1) green insulated ground conductor sized as required by NEC for the application as a minimum size.

C. Where run in walls, cable shall be fastened using B-Line Series BX4 or approved equivalent cable fasteners. Cable shall be fastened to wall stud not more than 8" from entry into device box

3.5 WIRING DEVICES

A. All wiring devices installed shall be identified as to which panel serves it and which overcorrect protection device protects the wiring device. This shall be accomplished via panel name and circuit number being written using a permanent marker on the back side of the cover plate. In health-care facilities, panel name and circuit number shall be permanently engraved into each receptacle cover plate.

3.6 MANUFACTURER'S DIRECTION

A. Contractor shall be responsible for coordinating all aspects of equipment electrical service installation for all electrical gear, devices, mechanical, plumbing, fire protection, architectural, and owner furnished equipment including any and all medical equipment. Contractor shall obtain and review actual manufacturer's installation instructions and shall install electrical facilities to said equipment in accordance with the instructions, NEC, NFPA and contract documents. Should a discrepancy exist between the manufacturer's installation directions and the contract documents, the engineer shall be notified in writing immediately.

3.7 COORDINATION WITH OTHER TRADES

A. Prior to purchasing and installing any wire and/or conduit for all circuitry to mechanical equipment, medical equipment, owner furnished equipment, and other equipment requiring electrical power furnished by other trades as part of this project, contractor shall review equipment cut sheets and shall verify exact equipment electrical requirements. Any discrepancies between contract documents and equipment submittals shall be immediately brought to the architect/engineer's attention for clarification.

END OF SECTION