



C. Alan Anderson
Architect, P.A.

Florida Department of Health
in
Palm Beach County

Air Monitor Station
Lamstein Lane
Royal Palm Beach

Construction Documents
Project Manual

December 7, 2017

Table of Contents

Division	Section Title	Pages
DIVISION 1 - GENERAL REQUIREMENTS		
01100	..... Summary	4
01210	..... Allowances	2
01230	..... Alternates	2
01250	..... Contract Modification Procedures.....	2
01270	..... Unit Prices	2
01290	..... Payment Procedures	4
01310	..... Project Management and Coordination.....	6
01330	..... Submittal Procedures.....	8
01400	..... Quality Requirements.....	6
01500	..... Construction Facilities and Temporary Controls	10
01600	..... Product Requirements	6
01770	..... Closeout Procedures	8
DIVISION 2 – SITE CONSTRUCTION		
02282	..... Termite Control	4
DIVISION 3 – CONCRETE		
033000	..... Cast-In-Place Concrete	18
DIVISIONS 4 to 12 (NOT USED)		
DIVISION 13 – SPECIAL CONSTRUCTION		
133419	..... Metal Building Systems – Prefabricated Metal Buildings	6
DIVISIONS 14 – 15 (NOT USED)		
DIVISION 26 – ELECTRICAL (See Drawings)		
DIVISIONS 27 to 31 (NOT USED)		
DIVISION 32 - EXTERIOR IMPROVEMENTS		
323113	..... Chain Link Fencing	6
329300	..... Landscaping	12
DIVISION 33 – UTILITIES (NOT USED)		

SECTION 01100 – SUMMARY – OVERALL SCOPE OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings, the Standard Contract or FLDOH Purchase Order between the Owner and Vendor and other Division 1 Specification Sections, apply to this Section.
 - 1. In the event that conflicts arise between the Specifications and Vendor's Standard Contract, said Contract will take precedence.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

Project Identification: The overall project consists of providing a new Air Monitor Station at Lamstein Lane in the Village of Royal Palm Beach for FLDOH in Palm Beach County, as shown in the drawing package. The Owner has elected to sub-contract with each trade for their required work on the project, but will require some minor cross coordination of work between these trades. These specifications will breakdown what is anticipated to be provided by each trade, with associated work and coordination. In the event that something is not called out but is required by that tradesman to complete the work, then said tradesman shall include such work as though required for a completed project.

Project Location: Lamstein Lane, Village of Royal Palm Beach, Florida

- 1. Owner: FLDOH in Palm Beach County

- B. Architect Identification: The Contract Documents were prepared for the Project by C. Alan Anderson Architect, P.A and Consultants.

The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Vendors. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all. Performance by the Vendor shall be required only to the extent consistent with the contract Documents and reasonably inferable from them as being necessary to produce the intended results. Dimensions shall be figures rather than determined by scale or rule. In the event of a conflict or inconsistency among the Contract Documents, or between the contract Documents and applicable codes, the Vendor shall provide the greatest quantity, largest degree of safety, highest quality or most stringent material or work.

- C. The Work consists of, but is not limited to, the following:
 - a. Site Prep and Concrete
 - b. Air Monitor Building
 - c. Electrical Service
 - d. Fencing
 - e. Landscaping and Irrigation

- D. The following summary of work is required to be performed on the project as shown in the drawings and outlined within the Specifications. Each tradesman will provide proposals to DOH-Palm Beach County for their scope of work for issuance of a contract or purchase order.
- a. Site Prep and Concrete: The Vendor to perform this work will be required to scrape and prep the site for the proposed new concrete slab as shown on the drawings and provide the new reinforced concrete slab as part of his scope of work. He will be required to grade and leave the site free of form work and debris, with all surrounding graded affected in an acceptable manner to accommodate the remaining work. However, he will not be required or responsible for cleaning up of other's work or deficiencies left by others. He should limit his work to the limits noted in the landscape work. Refer to the drawings for more detailed information on the work required.
 - b. Air Monitor Building: The air monitor building is a pre-fabricated unit that is delivered and set on the proposed concrete slab and anchored by the prefabricated building's manufacturer. It is anticipated that the building would be set and secured once the concrete slab has been poured and has cured.
 - c. Electrical Service: The Electrical Vendor will be responsible for providing new service to the site from an existing transformer as noted and connection from the meter to the panel of the prefabricated building. All wiring and conduit required will be the responsibility of the Electrical Vendor. It is our understanding that FPL will provide required access to the transformer for the electrician to connect service. Directional boring will be required from point of service connection to proposed new meter by the electricians.
 - d. Fencing: The Fencing Vendor will be required to provide all noted fencing and gates for the project as shown on the drawings. Once the slab and the building has been set and the electrical service provided, fencing work will then be performed to secure the site. Refer to drawings for more specific requirement of this work.
 - e. Landscaping and Irrigation: Landscaper shall anticipate sod replacement around the site at a maximum of 5'-0" beyond planter bed with similar material to match existing. This work shall include all plant material, weed guard and gravel/stone coverage noted. It shall also include some minor leveling and prep work of the site. Landscaper responsible for drip system in plant bed with connection to existing irrigation system, as determined by field verification.

1.3 CONTRACT

- A. The Work will be performed under separate Purchase Orders with the Florida Department of Health in Palm Beach County.

1.4 WORK SEQUENCE

- A. The work will be conducted under a single phase based on the required work of each trade and overall schedule. The following is a brief summary of anticipated schedule or order of work:
 - a. Site prep
 - b. Electrical rough-in of building to meter
 - c. Slab poured

- d. Electrical rough in
- e. Building set
- f. Electrical connections made
- g. Fencing
- h. Landscaping/Irrigation

1.5 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 48-division format and CSI/CSC's "MasterFormat" numbering system.

PART 2 - PRODUCTS (Not Used)

2.1 EXECUTION (Not Applicable)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01100

THIS PAGE LEFT INTENTIONALLY BLANK

SECTION 01210 - ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements governing allowances.
 - 1. Certain materials and equipment are specified in the Contract Documents by allowances. In some cases, these allowances include installation. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. If necessary, additional requirements will be issued by Change Order or as determined.
- B. The list of allowances shall be determined with Architect/Owner/Constructor input. Types of allowances include the following:
 - 1. Lump-sum allowances.
 - 2. Unit-cost allowances.
 - 3. Contingency allowances.
 - 4. Testing and inspecting allowances, if not established otherwise.
 - 5. Quantity allowances.
- C. Related Sections include the following:
 - 1. Division 1 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
 - 2. Division 1 Section "Unit Prices" for procedures for using unit prices.
 - 3. Division 1 Section "Quality Requirements" for procedures governing the use of allowances for testing and inspecting.

1.3 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect from the designated supplier.

1.4 SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders, as determined.
- B. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

1.5 CONTINGENCY ALLOWANCES

- A. Use the contingency allowance only as directed by Architect for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.
- B. Contractor's overhead, profit, and related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.
- C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins, as determined or established..
- D. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

1.6 UNUSED MATERIALS

- A. Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
 - 1. If requested by Architect, prepare unused material for storage by Owner when it is not economically practical to return the material for credit. If directed by Architect, deliver unused material to Owner's storage space. Otherwise, disposal of unused material is Contractor's responsibility.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

- A. Allowance schedule, if determined necessary, will be established during the bidding phase on any items which the Contractor feels might have been omitted and will be a cost to the Owner.
- B. Provide the following allowances:
 - 1. Allowance No. 1 TBD

END OF SECTION 01210

THIS PAGE LEFT INTENTIONALLY BLANK

SECTION 01230 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings, the Standard Contract between the Owner and Prime Contractor and other Division 1 Specification Sections, apply to this Section.
- B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for proposed alternates, suggested for cost saving means to bring the project within the Owner's established project budget.

1.3 DEFINITIONS

- A. Alternate: An amount proposed by Prime Contractor for certain work defined in the Documents that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents. The alternates may define the cost of the work in some cases should they need to reduce the cost of the project.
 - 1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Upon review of the Prime Contractors proposed alternate cost, the Owner's Representative and Architect will determine which alternates will be selected.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A Schedule of Proposed Alternates is included at the end of this Section. Specification Sections or Drawings referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

SCHEDULE OF PROPOSED ALTERNATES

A. The following alternates are to provide the Owner with possible actual cost of work should adjustments need to be made in the final proposed contract amount. These are proposed alternates by the Architect; Contractor may include others for consideration and identify other work so the Owner is aware of such cost, as determined.

1. Alternate Number 1: TBD.
2. Alternate Number 2: TBD.

END OF SECTION 01230

SECTION 01250 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Prime Contractor's Standard Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Sections include the following:
 - 1. Division 1 Section "Unit Prices" for administrative requirements for using unit prices.
 - 2. Division 1 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.3 MINOR CHANGES IN THE WORK

- A. Architect will issue through Construction Manager supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions" or as agreed upon.

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect 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. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request 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 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.

- B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change.
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 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.
 5. Comply with requirements in Division 1 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.
- C. Proposal Request Form: Use AIA Document G709 for Proposal Requests unless agreed otherwise.

1.5 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Proposal Request, a Change Order shall be issued in accordance with the Prime Contractor's Standard Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01250

SECTION 01270 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for unit prices.
- B. Related Sections include the following:
 - 1. Division 1 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
 - 2. Division 1 Section "Quality Requirements" for general testing and inspecting requirements.

1.3 DEFINITIONS

- A. Unit price is an amount proposed by the Prime Contractor's sub-contractors, stated in the proposal, as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- D. List of Unit Prices: A list of unit prices is included at the end of this Section. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 LIST OF UNIT PRICES

A. Unit Price No. 1 TBD

1. Description:
2. Unit of Measurement:

B. Unit Price No. 2 TBD

1. Description:
2. Unit of Measurement:

C.

END OF SECTION 01270

SECTION 01290 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Prime Contractor's Standard Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections include the following:
 - 1. Division 1 Section "Unit Prices" for administrative requirements governing use of unit prices.
 - 2. Division 1 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.

1.3 DEFINITIONS

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

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule. Contractor's schedule of values shall be broken down sufficiently to identify, work, trades and portions of phasing.
 - 1. Correlate 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. Submittals Schedule.
 - 2. Submit the Schedule of Values to Architect at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
 - 3. Subschedules: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values correlated with each phase of payment.

- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section, and individual work required under each section.
1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value.
 - 1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
 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. Include evidence of insurance or bonded warehousing if required.
 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 either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
 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. Each new Change Order may be listed as line items but must be broken down to identify each Item within the Change Order.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
 - 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Prime Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment, unless dictated otherwise within the Prime Contractor's contract.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect 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 of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
 - 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
 - 1. Submit partial waivers on each item for amount requested, before deduction for retainage, on each item.
 - 2. When an application shows completion of an item, submit final or full waivers.
 - 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 - 4. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
 2. Schedule of Values.
 3. Contractor's Construction Schedule (preliminary if not final).
 4. Products list.
 5. Submittals Schedule (preliminary if not final).
 6. List of Contractor's staff assignments.
 7. List of Contractor's principal consultants.
 8. Copies of building permits.
 9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 10. Initial progress report.
 11. Report of preconstruction conference.
 12. Certificates of insurance and insurance policies.
- H. Application for Payment at Substantial Completion: After issuing 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 Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- I. Final Payment Application: 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. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 6. AIA Document G707, "Consent of Surety to Final Payment."
 7. Evidence that claims have been settled.
 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 9. Final, liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01290

SECTION 01310 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General project coordination procedures.
 - 2. Conservation.
 - 3. Coordination Drawings.
 - 4. Administrative and supervisory personnel.
 - 5. Project meetings.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Closeout Procedures" for coordinating Contract closeout.

1.3 COORDINATION

- A. Coordination: Coordinate construction operations included in various 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 with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. If necessary, 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 other contractors to avoid conflicts

and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's Construction Schedule.
2. Preparation of the Schedule of Values.
3. Submitting for Background Checks, performed by the State of Florida Department of Management Services, required for all Contractors, subcontractors and their employees.
4. Installation and removal of temporary facilities and controls.
5. Delivery and processing of submittals.
6. Progress meetings and minutes.
7. Pre-installation conferences.
8. Project closeout activities.

- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

1.4 SUBMITTALS

- A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.

1. Indicate relationship of components shown on separate Shop Drawings.
2. Indicate required installation sequences.
3. Refer to Division 15 Section "Basic Mechanical Materials and Methods" and Division 16 Section "Basic Electrical Materials and Methods" for specific Coordination Drawing requirements for mechanical and electrical installations.

- B. Staff Names: Within 15 days of starting construction operations, submit a list of principal staff 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 and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys 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.

- C. Background Check Process: The Construction Manager may be required to submit background checks on all contractors, subcontractors and their employees to the State of Florida Department of Management Services in accordance with the Background Check Process. The Construction Manager shall insure that all final selected contractors and sub-contractors have received clearances accordingly if required by FDOH or Palm Beach County.

1.5 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

- A. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work.

1. Project Superintendent: The Contractor shall retain a single superintendent throughout the course of the Project until final completion unless requested otherwise by the Owner. Under no circumstances shall the Superintendent be reassigned to another project once construction has begun.

1.6 PROJECT MEETINGS

- A. General: 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 Owner and Architect of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within 3 days of the meeting.

- B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:

- a. Tentative construction schedule.
- b. Site Access.
 1. Background checks performed by the State of Florida Department of Management Services may be required for all Contractors, subcontractors and their employees. Please confirm with FDOH or Palm Beach County
- c. Critical work sequencing.
- d. Designation of responsible personnel.
- e. Procedures for processing field decisions and Change Orders.
- f. Procedures for processing Applications for Payment.
- g. Distribution of the Contract Documents.
- h. Submittal procedures.
- i. Preparation of Record Documents.
- j. Use of the premises.
- k. Responsibility for temporary facilities and controls.
- l. Parking availability.
- m. Office, work, and storage areas.
- n. Equipment deliveries and priorities.
- o. First aid.
- p. Security.
- q. Progress cleaning.

1. Background checks performed by the State of Florida Department of Management Services are required for all Contractors, subcontractors and their employees
 - r. Working hours.
- 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 Architect 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 Change Orders.
 - d. Purchases.
 - e. Deliveries.
 - f. Submittals.
 - g. Review of mockups.
 - h. Possible conflicts.
 - i. Compatibility problems.
 - j. Time schedules.
 - k. Weather limitations.
 - l. Manufacturer's written recommendations.
 - m. Warranty requirements.
 - n. Compatibility of materials.
 - o. Acceptability of substrates.
 - p. Temporary facilities and controls.
 - q. Space and access limitations.
 - r. Regulations of authorities having jurisdiction.
 - s. Testing and inspecting requirements.
 - t. Required performance results.
 - u. Protection of construction and personnel.
 3. Record significant conference discussions, agreements, and disagreements.
 4. 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. Progress Meetings: Conduct progress meetings at monthly intervals unless otherwise determined. Coordinate dates of meetings with preparation of payment requests.
1. Attendees: In addition to representatives of Owner and Architect, 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 conference shall be familiar with Project and authorized to conclude matters relating to the Work.

2. 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.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Work hours.
 - 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Change Orders.
 - 14) Documentation of information for payment requests.
 3. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
 - 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.
- E. Coordination Meetings: Conduct Project coordination meetings at regular intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and pre-installation conferences.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01310

THIS PAGE LEFT INTENTIONALLY BLANK

SECTION 01330 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.
- B. Related Sections include the following:
 - 1. Division 1 Section "Project Management and Coordination" for submitting Coordination Drawings.
 - 2. Division 1 Section "Quality Requirements" for submitting test and inspection reports and Delegated-Design Submittals and for erecting mockups.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Architect's responsive action.
- B. Informational Submittals: Written information that does not require Architect's approval. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

- A. General: Electronic copies of CAD Drawings of the Contract Drawings will not be provided by Architect for Contractor's use in preparing submittals, except for final record documents as required by the Owner. All shop drawings shall bear the approval of the shop drawing by the Prime Contractor to ensure he has reviewed the information.
- 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. 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. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

- C. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal.
1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Concurrent Review: Where concurrent review of submittals by Architect's consultants, Owner, or other parties is required, allow 21 days for initial review of each submittal.
 3. If intermediate submittal is necessary, process it in same manner as initial submittal.
 4. Allow 15 days for processing each resubmittal.
 5. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.
- D. Identification: Place a permanent label or title block on each submittal for identification. Place each submittal in an 8 1/2" x 11" bound folder with a permanent label or title block.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 4 by 5 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect. Shop drawings will not be reviewed without Contractor's approval stamp.
 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Unique identifier, including revision number.
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Other necessary identification.
- E. Specified Items: Highlight each submittal individually and appropriately. Each item to be used on the project from the manufacturer's literature for verification of each item to be used.
- F. Deviations: Highlight, encircle, or otherwise identify selected items or items which are deviations from the Contract Documents on submittals.
- G. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will discard submittals received from sources other than Contractor.
1. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements of the Contract Documents, including minor variations and limitations. Include the same label information as the related submittal.
 2. Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.
 3. Transmittal Form: Use AIA Document G810.

- H. 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.
- I. Use for Construction: Use only final submittals with mark indicating action taken by Architect in connection with construction.
- J. Record submittals: copies of all shop drawing submittals shall be retained by the Contractor unless determined otherwise and shall be turned over as part of the Close-Out package.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
 - 1. Number of Copies: Submit six copies of each submittal, unless otherwise indicated. Architect will return four copies. Mark up and retain one returned copy as a Project Record Document.
 - 2. Number of Copies: Submit copies of each submittal, as follows, unless otherwise indicated:
 - a. Initial Submittal: Submit a preliminary single copy of each submittal where selection of options, color, pattern, texture, or similar characteristics is required. Architect will return submittal with options selected.
 - b. Final Submittal: Submit six copies, unless copies are required for operation and maintenance manuals. Submit six copies where copies are required for operation and maintenance manuals. Architect will retain two copies; remainder will be returned. Mark up and retain one returned copy as a Project Record Document.
- 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 printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each submittal to show which products and options are applicable.
 - 3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Standard color charts.
 - e. Manufacturer's catalog cuts.
 - f. Wiring diagrams showing factory-installed wiring.
 - g. Printed performance curves.
 - h. Operational range diagrams.
 - i. Mill reports.
 - j. Standard product operating and maintenance manuals.
 - k. Compliance with recognized trade association standards.
 - l. Compliance with recognized testing agency standards.
 - m. Application of testing agency labels and seals.
 - n. Notation of coordination requirements.

- 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: Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shopwork manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Design calculations.
 - j. Compliance with specified standards.
 - k. Notation of coordination requirements.
 - l. Notation of dimensions established by field measurement.
 2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
 3. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 30 by 40 inches (750 by 1000 mm).
 4. Number of Copies: Submit one correctable, translucent, reproducible print and one blue- or black-line print of each submittal. Architect will return the reproducible print.
 5. Number of Copies: Submit copies of each submittal, as follows:
 - a. Initial Submittal: Submit one correctable, translucent, reproducible print and one blue- or black-line print. Architect will return the reproducible print.
- D. Coordination Drawings: Comply with requirements in Division 1 Section "Project Management and Coordination."
- E. Samples: Prepare physical units of materials or products, including the following:
1. Comply with requirements in Division 1 Section "Quality Requirements" for mockups.
 2. 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.
 3. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 4. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect's sample where so indicated. Attach label on unexposed side that includes the following:
 - a. Generic description of Sample.
 - b. Product name or name of manufacturer.
 - c. Sample source.

5. Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, provide the following:
 - a. Size limitations.
 - b. Compliance with recognized standards.
 - c. Availability.
 - d. Delivery time.
 6. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
 - a. If variation in color, pattern, texture, or other characteristic is inherent in the product represented by a Sample, submit at least, **[three]** < > sets of paired units that show approximate limits of the variations.
 7. Number of Samples for Initial Selection: Submit two full set[s] of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
 8. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
- F. Product Schedule or List: Prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
1. Type of product. Include unique identifier for each product.
 2. Number and name of room or space.
 3. Location within room or space.
- G. Delegated-Design Submittal: Comply with requirements in Division 1 Section "Quality Requirements."
- H. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation."
- I. Application for Payment: Comply with requirements in Division 1 Section "Payment Procedures."
- J. Schedule of Values: Comply with requirements in Division 1 Section "Payment Procedures."
- K. 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. Include the following information in tabular form:
1. Name, address, and telephone number of entity performing subcontract or supplying products.
 2. Number and title of related Specification Section(s) covered by subcontract.

3. Drawing number and detail references, as appropriate, covered by subcontract.

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
 1. Number of Copies: Submit two copies of each submittal, unless otherwise indicated. Architect will not return copies.
 2. Certificates and Certifications: Provide a notarized 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.
 3. Test and Inspection Reports: Comply with requirements in Division 1 Section "Quality Requirements."
- B. Contractor's Construction Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation."
- C. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- D. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements.
- E. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements and, where required, is authorized for this specific Project.
- G. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements. Include evidence of manufacturing experience where required.
- H. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements.
- I. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
- J. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements.
- K. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed

before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

- L. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements.
- M. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- N. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements in Division 1 Section "Closeout Procedures."
- O. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- P. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
 - 1. Preparation of substrates.
 - 2. Required substrate tolerances.
 - 3. Sequence of installation or erection.
 - 4. Required installation tolerances.
 - 5. Required adjustments.
 - 6. Recommendations for cleaning and protection.
- Q. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
 - 1. Name, address, and telephone number of factory-authorized service 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.
- R. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

- S. Construction Photographs: Comply with requirements in Division 1 Section "Construction Progress Documentation."
- T. Background check: Provide verification of submittal for background check for all contractors and sub-contractors and their employees and copies of verification of approval, accordingly.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. 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 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken:
- C. Informational Submittals: Architect will review each submittal and will not return it, or will reject and return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

END OF SECTION 01330

SECTION 01400 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This 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-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 quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Sections include the following:
 - 1. Division 1 Section "Cutting and Patching" for repair and restoration of construction disturbed by testing and inspecting activities.
 - 2. Divisions 2 through 16 Sections for specific test and inspection requirements.

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 ensure that proposed construction complies with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full-size, physical example assemblies to illustrate finishes and materials. Mockups are used to verify selections made under Sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Mockups establish the standard by which the Work will be judged.

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

1.4 SUBMITTALS

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
1. Specification Section number and title.
 2. Description of test and inspection.
 3. Identification of applicable standards.
 4. Identification of test and inspection methods.
 5. Number of tests and inspections required.
 6. Time schedule or time span for tests and inspections.
 7. Entity responsible for performing tests and inspections.
 8. Requirements for obtaining samples.
 9. Unique characteristics of each quality-control service.
- C. Reports: Prepare and submit certified written reports that 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. Ambient conditions at time of sample taking and testing and inspecting.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and reinspecting.
- D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.5 QUALITY ASSURANCE

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

- C. **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.
- D. **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.
- E. **Professional Engineer Qualifications:** A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that is similar to those indicated for this Project in material, design, and extent.
- F. **Testing Agency Qualifications:** An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed.
- G. **Preconstruction Testing:** Testing agency shall perform preconstruction testing for compliance with specified requirements for performance and test methods.
 - 1. **Contractor responsibilities include the following:**
 - a. Provide test specimens and assemblies representative of proposed materials and construction. Provide sizes and configurations of assemblies to adequately demonstrate capability of product to comply with performance requirements.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - 2. **Testing Agency Responsibilities:** Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents. Contractor will be required to follow up to the Architect with any required corrective action.
- H. **Mockups:** Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
 - 2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 - 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
 - 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 6. Demolish and remove mockups when directed, unless otherwise indicated.

1.6 QUALITY CONTROL

- A. Contractor Responsibilities: Unless otherwise indicated, provide quality-control services specified and required by authorities having jurisdiction.
1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall employ a testing agency that is acceptable to both the Owner and the Architect.
 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- B. Special Tests and Inspections: Contractor will engage an approved testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner.
1. Testing agency will notify Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 2. Testing agency will submit a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
 3. Testing agency will submit a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 4. Testing agency will interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 5. Testing agency will retest and reinspect corrected work.
- 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.
- D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.
- E. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 3. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 4. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.

5. Do not perform any duties of Contractor.
- F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field-curing of test samples.
 5. 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 quality-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.

PART 2 - PRODUCTS

2.1 Low VOC Products

- A. General: it is the intent of the project and specifications whether specifically noted or not, that all products used on the project shall have low VOC levels.
- B. VOC Content of Interior Sealants and Adhesives: Where adhesives, sealants, sealant primers and finishes are provided for use inside, provide products that comply with VOC content listed in the LEED NC Version 3.0 and according to the South Coast Air Quality Management District (SCAQMD) Rule #1168, effective date July 1, 2005 and rule amendment date of January 7, 2005.

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
1. Comply with the Contract Document requirements for Division 1 Section "Cutting and Patching."

- 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 01400

SECTION 01500 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes requirements for construction facilities and temporary controls, including temporary utilities, support facilities, and security and protection.
- B. Temporary utilities include, but are not limited to, the following:
 - 1. Water service and distribution.
 - 2. Temporary electric power and light.
 - 3. Temporary heat.
 - 4. Ventilation.
 - 5. Telephone service.
 - 6. Sanitary facilities, including drinking water.
 - 7. Storm and sanitary sewer.
- C. Support facilities include, but are not limited to, the following:
 - 1. Field offices and storage sheds, as determined.
 - 2. Temporary roads and paving (as required).
 - 3. Temporary enclosures.
 - 4. Temporary project identification signs and bulletin boards.
 - 5. Waste disposal services.
 - 6. Rodent and pest control.
 - 7. Construction aids and miscellaneous services and facilities.
- D. Security and protection facilities include, but are not limited to, the following:
 - 1. Temporary fire protection.
 - 2. Barricades, warning signs, and lights.
 - 3. Enclosure fence for the site.
 - 4. Environmental protection.

1.3 SUBMITTALS

- A. Temporary Utilities: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.

- B. Implementation and Termination Schedule: Within 15 days of the date established for commencement of the Work, submit a schedule indicating implementation and termination of each temporary utility.

1.4 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:
 - 1. Building code requirements.
 - 2. Health and safety regulations.
 - 3. Utility company regulations.
 - 4. Police, fire department, and rescue squad rules.
 - 5. Environmental protection regulations.
 - 6. Southwest Florida Water Management District.
- B. Standards: Comply with NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations," ANSI A10 Series standards for "Safety Requirements for Construction and Demolition," and NECA Electrical Design Library "Temporary Electrical Facilities."
 - 1. Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70 "National Electric Code."
- C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.5 PROJECT CONDITIONS

- A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to the Owner, change over from use of temporary service to use of permanent service.
- B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services and facilities as the Work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire-prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on-site.

PART 2 - PRODUCTS

2.1 TEMPORARY MATERIALS

- A. General: Provide new materials. If acceptable to the Architect, the Contractor may use undamaged, previously used materials in serviceable condition. Provide materials suitable for use intended.
- B. Lumber and Plywood: Comply with requirements in Division 6 Section "Rough Carpentry."

1. For job-built temporary offices, shops, and sheds within the construction area, provide UL-labeled, fire-treated lumber and plywood for framing, sheathing, and siding.
 2. For signs and directory boards, provide exterior-type, Grade B-B high-density concrete form overlay plywood of sizes and thicknesses indicated.
 3. For fences and vision barriers, provide minimum 3/8-inch- (9.5-mm-) thick exterior plywood.
 4. For safety barriers, sidewalk bridges, and similar uses, provide minimum 5/8-inch- (16-mm-) thick exterior plywood.
- C. Roofing Materials: Provide UL Class A standard-weight asphalt shingles or UL Class C mineral-surfaced roll roofing on roofs of job-built temporary offices, shops, and sheds.
- D. Paint: Comply with requirements of Division 9 Section "Painting."
1. For job-built temporary offices, shops, sheds, fences, and other exposed lumber and plywood, provide exterior-grade acrylic-latex emulsion over exterior primer.
 2. For sign panels and applying graphics, provide exterior-grade alkyd gloss enamel over exterior primer.
- E. Tarpaulins: Provide waterproof, fire-resistant, UL-labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosures, provide translucent, nylon-reinforced, laminated polyethylene or polyvinyl chloride, fire-retardant tarpaulins.
- F. Water: Provide potable water approved by local health authorities.
- G. Open-Mesh Fencing: Provide 0.120-inch- (3-mm-) thick, galvanized 2-inch (50-mm) chain link fabric fencing 6 feet (2 m) high with galvanized barbed-wire top strand and galvanized steel pipe posts, 1-1/2 inches (38 mm) I.D. for line posts and 2-1/2 inches (64 mm) I.D. for corner posts.

2.2 EQUIPMENT

- A. General: Provide new equipment. If acceptable to the Architect, the Contractor may use undamaged, previously used equipment in serviceable condition. Provide equipment suitable for use intended.
- B. Electrical Outlets: Provide properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-Volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button, and pilot light for connection of power tools and equipment.
- C. Electrical Power Cords: Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
- D. Heating Units: Provide temporary heating units that have been tested and labeled by UL, FM, or another recognized trade association related to the type of fuel being consumed.

- E. Temporary Offices: Provide prefabricated or mobile units or similar job-built construction with lockable entrances, operable windows, and serviceable finishes. Provide heated and air-conditioned units on foundations adequate for normal loading.
- F. Temporary Toilet Units: Provide self-contained, single-occupant toilet units of the chemical, aerated recirculation, or combustion type. Provide units properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
- G. Fire Extinguishers: Provide hand-carried, portable, UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for the exposures.
 - 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Engage the appropriate local utility company to install temporary service or connect to existing service. Where company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with company recommendations.
 - 1. Arrange with company and existing users for a time when service can be interrupted, if necessary, to make connections for temporary services.
 - 2. Provide adequate capacity at each stage of construction.
 - 3. Obtain easements to bring temporary utilities to the site where the Owner's easements cannot be used for that purpose.
 - 4. Use Charges: Cost or use charges for temporary facilities are not chargeable to the Owner or Architect. Neither the Owner nor Architect will accept cost or use charges as a basis of claims for Change Orders.
- B. Water Service: Install water service and distribution piping of sizes and pressures adequate for construction until permanent water service is in use.
 - 1. Sterilization: Sterilize temporary water piping prior to use.

- C. Temporary Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnects, automatic ground-fault interrupters, and main distribution switch gear.
1. Install electric power service underground, except where overhead service must be used.
 2. Power Distribution System: Install wiring overhead and rise vertically where least exposed to damage. Where permitted, wiring circuits not exceeding 125 Volts, ac 20 Ampere rating, and lighting circuits may be nonmetallic sheathed cable where overhead and exposed for surveillance.
- D. Temporary Lighting: When overhead floor or roof deck has been installed, provide temporary lighting with local switching.
1. Install and operate temporary lighting that will fulfill security and protection requirements without operating the entire system. Provide temporary lighting that will provide adequate illumination for construction operations and traffic conditions.
- E. Temporary Heat: Provide temporary heat required by construction activities for curing or drying of completed installations or for protection of installed construction from adverse effects of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce the ambient condition required and minimize consumption of energy.
- F. Heating Facilities: Except where the Owner authorizes use of the permanent system, provide vented, self-contained, LP-gas or fuel-oil heaters with individual space thermostatic control.
1. Use of gasoline-burning space heaters, open flame, or salamander heating units is prohibited.
- G. Temporary Telephones: Provide temporary telephone service throughout the construction period for all personnel engaged in construction activities. Install telephone on a separate line for each temporary office and first-aid station.
1. Separate Telephone Lines: Provide additional telephone lines for the following:
 - a. Where an office has more than 2 occupants, install a telephone for each additional occupant or pair of occupants.
 - b. Provide a dedicated telephone line for a fax machine in the field office.
 2. At each telephone, post a list of important telephone numbers.
- H. Sanitary facilities include temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for the type, number, location, operation, and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs.
1. Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Provide covered waste containers for used material.

- I. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Use of pit-type privies will not be permitted.
- J. Wash Facilities: Install wash facilities supplied with potable water at convenient locations for personnel involved in handling materials that require wash-up for a healthy and sanitary condition. Dispose of drainage properly. Supply cleaning compounds appropriate for each condition.
- K. Drinking-Water Facilities: Provide containerized, tap-dispenser, bottled-water drinking-water units, including paper supply.
 - 1. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 deg F (7 to 13 deg C).
- L. Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of storm water from heavy rains.

3.3 SUPPORT FACILITIES INSTALLATION

- A. Locate field offices, storage sheds, and other temporary construction and support facilities for easy access. Coordinate locations with Architect and Owner.
 - 1. Maintain support facilities until near Substantial Completion. Remove prior to Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to the Owner.
- B. Provide incombustible construction for offices, shops, and sheds located within the construction area or within 30 feet (9 m) of building lines. Comply with requirements of NFPA 241.
- C. Field Offices: Provide insulated, weather tight temporary offices of sufficient size to accommodate required office personnel at the Project Site. Keep the office clean and orderly for use for small progress meetings.
- D. Storage and Fabrication Sheds: Install storage and fabrication sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility service. Sheds may be open shelters or fully enclosed spaces within the building or elsewhere on-site.
- E. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.
 - 1. Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
 - 2. Install tarpaulins securely, with incombustible wood framing and other materials. Close openings of 25 sq. ft. (2.3 sq. m) or less with plywood or similar materials.

3. Close openings through floor or roof decks and horizontal surfaces with load-bearing, metal-framed construction.
- F. Temporary Lifts and Hoists: Provide facilities for hoisting materials and employees. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
 - G. Project Identification and Temporary Signs: Prepare project identification and other signs of size indicated. Install signs where indicated to inform the public and persons seeking entrance to the Project. Support on posts or framing of preservative-treated wood or steel. Do not permit installation of unauthorized signs.
 1. Project Identification Signs: Engage an experienced sign painter to apply graphics. Comply with details indicated.
 2. Temporary Signs: Prepare signs to provide directional information to construction personnel and visitors.
 - H. Temporary Exterior Lighting: Install exterior yard and sign lights so signs are visible when Work is being performed.
 - I. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal. Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material lawfully.
 - J. Add references to approved disposal methods. Cross-reference Sections that specify handling of special waste material. See Evaluations for further discussion and sample text.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Except for use of permanent fire protection as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until Substantial Completion, or longer, as requested by the Architect.
- B. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations."
 1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
 2. Store combustible materials in containers in fire-safe locations.
 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for fighting fires. Prohibit smoking in hazardous fire-exposure areas.

4. Provide supervision of welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
- C. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed, provide lighting, including flashing red or amber lights.
 - D. Enclosure Fence: Before excavation begins, install an enclosure fence with lockable entrance gates. Locate where indicated, or enclose the entire site or the portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs, and other animals from easily entering the site, except by the entrance gates.
 1. Provide open-mesh, chain link fencing with posts set in a compacted mixture of gravel and earth.
 - E. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
 1. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.
 - F. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted or that other undesirable effects might result. Avoid use of tools and equipment that produce harmful noise. Restrict use of noise-making tools and equipment to hours that will minimize complaints from persons or firms near the site.

3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
 2. Protection: Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- C. Termination and Removal: Unless the Architect requests that it be maintained longer, remove each temporary facility when the need has ended, when 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 the temporary facili-

ty. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are the Contractor's property. The Owner reserves the right to take possession of project identification signs.
2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where the area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil in the area. 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 the temporary entrances, as required by the governing authority.
3. At Substantial Completion, clean and renovate permanent facilities used during the construction period including, but not limited to, the following:
 - a. Replace air filters and clean inside of ductwork and housings.
 - b. Replace significantly worn parts and parts subject to unusual operating conditions.
 - c. Replace lamps burned out or noticeably dimmed by hours of use.

END OF SECTION 01500

THIS PAGE LEFT INTENTIONALLY BLANK

SECTION 01600 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following administrative and procedural requirements: selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.
- B. Related Sections include the following:
 - 1. Division 1 Section "Closeout Procedures" for submitting warranties for contract closeout.
 - 2. Divisions 2 through 16 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

- A. Products: Items purchased 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, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Substitutions: Proposed changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
- C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

- D. **Manufacturer's Warranty:** Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
- E. **Special Warranty:** Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

1.4 SUBMITTALS

- A. **Product List:** Submit a list, in tabular form, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.
 - 1. **Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.**
 - 2. **Completed List:** Within 60 days after date of commencement of the Work, submit 3 copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.
 - 3. **Architect's Action:** Architect will respond in writing to Contractor within 15 days of receipt of completed product list. Architect's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Architect's response, or lack of response, does not constitute a waiver of requirement that products comply with the Contract Documents.
- B. **Substitution Requests:** Submit three 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. All substitution requests shall be made during the bidding process 7 days prior to receipt of goods.
 - 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 material or product cannot be provided.**
 - b. **Coordination information, including a list of changes or modifications 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. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.**
 - d. **Product Data, including drawings and descriptions of products and fabrication and installation procedures.**
 - e. **Samples, where applicable or requested.**
 - f. **Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.**

- g. 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 lack of availability or delays in delivery.
 - h. Cost information, including a proposal of change, if any, in the Contract Sum.
 - i. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
 - j. 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. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
 - a. Form of Acceptance: Change Order for credit or written approval.
 - b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.
- C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 1 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

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

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
 - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - 4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
 - 5. Store products to allow for inspection and measurement of quantity or counting of units.
 - 6. Store materials in a manner that will not endanger Project structure.

7. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 8. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 9. Protect stored products from damage.
- B. Storage: Provide a secure location and enclosure at Project site for storage of materials and equipment. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT OPTIONS

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

B. Product Selection Procedures: Procedures for product selection include the following:

1. Product: Where Specification paragraphs or subparagraphs titled "Product" name a single product and manufacturer, provide the product named.
2. Products: Where Specification paragraphs or subparagraphs titled "Products" introduce a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
 - a. Substitutions may be considered, unless otherwise indicated. It is the intent of these documents to establish all substitutions at the time of bidding.
3. Manufacturers: Where Specification paragraphs or subparagraphs titled "Manufacturers" introduce a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
4. Available Products: Where Specification paragraphs or subparagraphs titled "Available Products" introduce a list of names of both products and manufacturers, provide one of the products listed or another product that complies with requirements. Comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.
5. Available Manufacturers: Where Specification paragraphs or subparagraphs titled "Available Manufacturers" introduce a list of manufacturers' names, provide a product by one of the manufacturers listed or another manufacturer that complies with requirements. Comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.
6. Product Options: Where Specification paragraphs titled "Product Options" indicate that size, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide either the specific product or system indicated or a comparable product or system by another manufacturer. Comply with provisions in "Product Substitutions" Article.
7. Basis-of-Design Products: Where Specification paragraphs or subparagraphs titled "Basis-of-Design Product[s]" are included and also introduce or refer to a list of manufacturers' names, provide either the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.
 - a. Substitutions may be considered, unless otherwise indicated.
8. Products: Products to be used on this project shall have the lowest available level of VOC, regardless of any oversight within the specification.

2.2 PRODUCT SUBSTITUTIONS

- A. Timing: Architect will consider requests for substitution if received within 60 days after the Notice to Proceed the Notice of Award. Requests received after that time may be considered or rejected at discretion of Architect. It is the intent of these documents to establish all substitutions at the time of bidding.

- B. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 2. Requested substitution does not require any revisions to the Contract Documents.
 3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 4. Substitution request is fully documented and properly submitted.
 5. Requested substitution will not adversely affect Contractor's Construction Schedule.
 6. Requested substitution has received necessary approvals of authorities having jurisdiction.
 7. Requested substitution is compatible with other portions of the Work.
 8. Requested substitution has been coordinated with other portions of the Work.
 9. Requested substitution provides specified warranty.
 10. 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 01600

SECTION 01770 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following, unless determined otherwise by Contractor Agreement:
 - 1. Inspection procedures.
 - 2. Project Record Documents.
 - 3. Operation and maintenance manuals.
 - 4. Warranties.
 - 5. Instruction of Owner's personnel.
 - 6. Final cleaning.
- B. Related Sections include the following:
 - 1. Division 1 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
 - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 - 2. Advise Owner of pending insurance changeover requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 5. Prepare and submit Project Record Documents, operation, and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
 - 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 - 7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.

8. Complete startup testing of systems.
 9. Submit test/adjust/balance records.
 10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 11. Advise Owner of changeover in heat and other utilities.
 12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 13. Complete final cleaning requirements, including touchup painting.
 14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect (Punch List), 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. The Architect will make only one reinspection. All costs associated with the Architect's required reinspection shall be the Contractor's responsibility.
 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

A. Procedures:

1. Three hard copies (books), each containing a disk with all information provided within the book, shall be assembled into three 3-ring binders and forwarded to the Project Architect for review. The following information/items are to be included, as determined necessary. Refer to Section 0120 Payment Procedures for Final Payment Application requirements.
 - a. Include a cover page in each binder identifying the project by name and DOH number.
 - b. Submit to Architect with a transmittal.
 - c. Certificate of Contract Completion
 - d. Contractor's Guarantee of Construction for one year from the Date of Substantial Completion.
 - e. Copy of the approval by the Architect/Engineer and the transmittal to the Using Agency of manuals, shop drawings, As Built drawings (two ½ size sets of drawings and copies on electronic media), brochures, warranties.
 - f. List of Subcontractors, with telephone numbers and addresses.
 - g. Fully executed Roof Warranties as required by specifications, in the name of the Using Agency.
 - h. Verification that Using Agency personnel have been trained in the operation of their new equipment (per system: HVAC, controls, fire alarm, etc.), attendance lists and preferred.
 - i. Other special warranties as required by specifications, in the name of the Using Agency.

- j. Contractor's Certificate of Asbestos Use
 - k. Copy of temporary Certificate of Occupancy.
2. The Architect will review the submission and when confirmed complete, will:
- a. Send one binder to the Using Agency
 - b. Sign and submit the final pay request to the Using Agency
 - c. Send two binders to the attention of the Administrator of the County Health Department where the work was performed.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
- 1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)
- A. Preparation: Submit copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
- 1. Organize list of spaces in sequential order, starting with exterior areas first.
 - 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 - a. Include the following information at the top of each page: Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.
- 1.6 PROJECT RECORD DOCUMENTS
- A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours. Contractor's failure to maintain updated record drawings shall be deemed justification for withholding Contractor Applications for Payment until the Contractor has updated the Record Drawings.
- B. Record Drawings: Maintain and submit one set of blue- or black-line white prints of Contract Drawings and Shop Drawings.
- 1. 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 prepare the marked-up Record Prints.

- a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
 - b. Accurately record information in an understandable drawing technique.
 - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - d. Mark Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings.
2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
 3. Mark important additional information that was either shown schematically or omitted from original Drawings.
 4. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
 5. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.
- C. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications. Mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 3. Note related Change Orders, Record Drawings, and Product Data, where applicable.
- D. Record Product Data: Submit two copies of each Product Data submittal. Mark one set to indicate the actual product installation where installation varies substantially from that indicated in Product Data.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 3. Note related Change Orders, Record Drawings, and Record Specifications, where applicable.
- E. Record shop drawings: The Contractor shall retain a final copy of all approved shop drawings during the course of the project, organized in CSI format and submit as part of the Owner's Close-Out package. These shall be separate from any other submittal.
- F. Miscellaneous Record Submittals: Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind miscellaneous records and identify each, ready for continued use and reference.

1.7 OPERATION AND MAINTENANCE MANUALS

- A. Assemble three complete sets of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system into heavy 3-ring binders, vinyl-covered. All information shall be copied to a computer disk and included within each binder. Include operation and maintenance data required in individual Specification Sections and as follows:
1. Operation Data:
 - a. Emergency instructions and procedures.
 - b. System, subsystem, and equipment descriptions, including operating standards.
 - c. Operating procedures, including startup, shutdown, seasonal, and weekend operations.
 - d. Description of controls and sequence of operations.
 - e. Piping diagrams.
 2. Maintenance Data:
 - a. Manufacturer's information, including list of spare parts.
 - b. Name, address, and telephone number of Installer or supplier.
 - c. Maintenance procedures.
 - d. Maintenance and service schedules for preventive and routine maintenance.
 - e. Maintenance record forms.
 - f. Sources of spare parts and maintenance materials.
 - g. Copies of maintenance service agreements.
 - h. Copies of warranties and bonds.
- B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.

1.8 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
1. Bind warranties and bonds (2 copies) in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (115-by-280-mm) 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. Provide a list of all Subcontractors who performed work on the project and include company name, contact, address and phone numbers.
- C. 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 DEMONSTRATION AND TRAINING

- A. Instruction: Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
1. Provide instructors experienced in operation and maintenance procedures.
 2. Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
 3. Schedule training with Owner with at least seven days' advance notice.
 4. Coordinate instructors, including providing notification of dates, times, length of instruction, and course content.
 5. Within the Close-Out Documents, provide a form with the above information with signoff of those attending the training.
- B. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections. For each training module, develop a learning objective and teaching outline. Include instruction for the following:
1. System design and operational philosophy.
 2. Review of documentation.
 3. Operations.
 4. Adjustments.
 5. Troubleshooting.
 6. Maintenance.
 7. Repair.

3.2 FINAL CLEANING FOR ENTIRE BUILDING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- a. 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. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - g. Sweep concrete floors broom clean in unoccupied spaces.
 - h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
 - i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - j. Remove labels that are not permanent.
 - k. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 - l. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - m. Replace parts subject to unusual operating conditions.
 - n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - p. Clean ducts, blowers, and coils if units were operated without filters during construction.
 - q. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and

defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

- r. Leave Project clean and ready for occupancy.
 - s. Floor cleaning: Contractor shall steam clean or use other means on all tile floors and grout to reflect new.
- B. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report and include within the Close-Out Documents.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.
- 3.3 Contractor One Year Warranty
- A. General: at the end of the Contractor's one year warranty period, the Contractor shall contact the Owner and Architect to schedule a walk-through to close out the warranty period. All warranties shall remain in effect until this walk-through has been completed. It is the sole responsibility of the Contractor to schedule and coordinate this warranty closeout.

END OF SECTION 01770

SECTION 02282 - TERMITE CONTROL

PART I GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. Provide soil treatment for termite control, as herein specified and as indicated on drawings.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and application instructions.

1.4 QUALITY ASSURANCE

- A. In addition to requirements of these specifications, comply with manufacturer's instructions and recommendations for work, including preparation of substrate and application.
- B. Engage a professional pest control operator, licensed in accordance with regulations of governing authorities for application of soil treatment solution.
- C. Use only termiticides which bear a Federal registration number of the U.S. Environmental Protection Agency.

1.5 JOB CONDITIONS

- A. Restrictions: Do not apply soil treatment solution until excavating, filling and grading operations are completed, except as otherwise required in construction operations.
- B. To insure penetration, do not apply soil treatment to frozen or excessively wet soils or during inclement weather. Comply with handling and application instructions of the soil toxicant manufacturer.

1.6 SPECIFIC PRODUCT WARRANTY

- A. Furnish written warranty certifying that applied soil termiticide treatment will prevent infestation of subterranean termites and, that if subterranean termite activity is discovered during warranty period, Contractor will re-treat soil and repair or replace damage caused by termite infestation.

1. Provide warranty for a period of 5 years from date of treatment, signed by Applicator and Contractor.

PART 2 PRODUCTS

2.1 SOIL TREATMENT SOLUTION

- A. Use an emulsible concentrate termiticide for dilution with water, specially formulated to prevent infestation by termites that is approved and permitted by law. Fuel oil will not be permitted as a diluent. Provide a solution consisting of one of following chemical elements and concentrations that is permitted and meets current laws and regulations:
 1. Cypermethrin (“Prevail FT Termiticide”); 0.25 percent in water emulsion.
 2. Permethrin (“Dragnet”, “Torpedo”); 0.5 percent in water emulsion.
 3. Other solutions may be used as recommended by Applicator if also acceptable to Architect and approved for intended application by jurisdictional authorities. Use only soil treatment solutions which are not injurious to planting.

PART 3 EXECUTION

3.1 APPLICATION

- A. Surface Preparation: Remove foreign matter which could decrease effectiveness of treatment on areas to be treated. Loosen, rake and level soil to be treated, except previously compacted areas under slabs and foundations. Toxicants may be applied before placement of compacted fill under slabs, if recommended by toxicant manufacturer.
- B. Application Rates: Apply soil treatment solution as follows:
 1. Under slab-on-grade structures, treat soil before concrete slabs are placed, using the following rates of application:
 - a. Apply 4 gallons of chemical solution per 10 lin. ft. to soil in critical areas under slab, including entire inside perimeter inside of foundation walls, along both sides of interior partition walls, around plumbing pipes and electric conduit penetrating slab, and around interior column footers.
 - b. Apply one gallon of chemical solution per 10 sq. ft. as an overall treatment under slab and attached slab areas where fill is soil or unwashed gravel. Apply 1-1/2 gallons of chemical solution to areas where fill is washed gravel or other coarse absorbent material.
 - c. Apply 4 gallons of chemical solution per 10 lin. ft. of trench, for each foot of depth from grade to footing, along outside edge of building. Dig a trench 6" to 8" wide along outside of foundation to a depth of not less than 12". Punch holes to top of footing at not more than 12" o.c. and apply chemical solution. Mix chemical solution with the soil as it is being replaced in trench.
 2. At hollow masonry foundations or grade beams, treat voids at rate of 2 gal. per 10 lin. ft., poured directly into the hollow spaces.

3. At expansion joints, control joints, and areas where slabs will be penetrated, apply at rate of 4 gals. per 10 lin. ft. of penetration.
4. Post signs in areas of application to warn workers that soil termiticide treatment has been applied. Remove signs when areas are covered by other construction.
5. Reapply soil treatment solution to areas disturbed by subsequent excavation, landscape grading, or other construction activities following application.

END OF SECTION 02282

This Page Left Intentionally Blank

SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Formwork for cast-in-place concrete, with shoring, bracing, and anchorage.
Formwork accessories.
2. Form stripping.
3. Reinforcing steel for cast-in-place concrete.
4. Cast-in-place concrete, including concrete for the following:
Foundations, footings.
5. Slabs on grade.
6. Equipment pads and bases.
7. Concrete curing.

B. Related Sections: Unit Masonry:Division

1.2 DEFINITIONS

- A. Unexposed Finish: A general-use finish, with no appearance criteria, applicable to all formed concrete concealed from view after completion of construction.
- B. Exposed Finish: A general-use finish applicable to all formed concrete exposed to view and including surfaces which may receive a paint coating (if any).

1.3 SUBMITTALS

- A. Shop Drawings: Submit shop drawings for fabrication and placement of the following:
 1. Reinforcement: Comply with ACI SP-66. Include bar schedules, diagrams of bent bars, arrangement of concrete reinforcement, and splices.
 2. Show construction joints.
- B. Quality Control Submittals: Submit the following information related to quality assurance requirements specified:
 1. Design data: Submit proposed mix designs and test data before concrete operations begin.
Identify for each mix submitted the method by which proportions have been selected.
 - a. For mix designs based on field experience, include individual strength test results, standard deviation, and required average compressive strength f_c calculations.
 - b. For mix designs based on trial mixtures, include trial mix proportions, test results, and graphical analysis and show required average compressive strength f_c .
 - c. Indicate quantity of each ingredient per cubic yard of concrete.
 - d. Indicate type and quantity of admixtures proposed or required.
- C. Test reports: Submit laboratory test reports for all testing specified.
- D. Certifications: Submit affidavits from an independent testing agency certifying that all materials

furnished under this section conform to specifications.

- E. Certifications: Provide certification from manufacturers of concrete admixtures that chloride content complies with specified requirements.
- F. Submit batch tickets complying with ASTM C 685 or delivery tickets complying with ASTM C 94, as applicable, for each load of concrete used in the work.

1.4 QUALITY ASSURANCE

- A. Codes and Standards: Comply with the following documents, except where requirements of the contract documents or of governing authorities are more stringent:
 - 1. ACI 301.
 - 2. ACI 318.
 - 3. CRSI Manual of Standard Practice.
- B. Testing Agency Services:
 - 1. Employ, at contractor's expense, an independent testing agency acceptable to the Architect to perform specified tests and other services required for quality assurance.
 - 2. Testing agency shall meet ASTM E 329 requirements
- C. Source of Materials: Obtain materials of each type from same source for the entire project.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver reinforcement to project site bundled and tagged with metal tags indicating bar size, lengths and other data corresponding to information shown on placement drawings.
- B. Store concrete reinforcement materials at the site to prevent damage and accumulation of dirt or rust. Store cementitious materials in a dry, weather tight location. Maintain accurate records of shipment and use.
- C. Store aggregates to permit free drainage and to avoid contamination with deleterious matter or other aggregates. When stockpiled on ground, discard bottom 6 inches of pile.
- D. Handle aggregates to avoid segregation.

PART 2 - PRODUCTS

2.1 FORM WORK

- A. Facing Materials:
 - 1. Unexposed finish concrete: Any standard form materials that produce structurally sound concrete. Exposed finish concrete: Materials selected to offer optimum smooth, stain-free final appearance and minimum number of joints. Provide materials with sufficient strength to resist hydrostatic head without bow or deflection in excess of allowable tolerances, and as follows:
 - a. Plywood: PS-1 B-B (Concrete Form) Plywood", Class I, Exterior Grade, mill-oiled and

edge sealed.

B. Form Work Accessories:

1. Form coating: Form release agent that will not adversely affect concrete surfaces or prevent subsequent application of concrete coatings.
2. Metal ties: Commercially manufactured types; cone snap ties, taper removable bolt, or other type which will leave no metal closer than 1-1/2 inches from surface of concrete when forms are removed, leaving not more than a 1 inch diameter hole in concrete surface.
3. Fillets: Wood or plastic fillets for chamfered corners, in maximum lengths possible.

2.2 REINFORCING MATERIALS

A. Reinforcing Bars: Provide deformed bars complying with the following, except where otherwise indicated:

1. ASTM A 615, Grade 60. All reinforcement shall have a minimum of 25% post consumer recycled content for LEED certification. Provide substantiating documentation.

B. Reinforcing Accessories:

1. Tie wire: Black annealed type, 16-1/2 gage or heavier.
2. Supports: Bar supports conforming to specifications of CRSI "Manual of Standard Practice". Class 1 (plastic protected) at all formed surfaces which will be exposed to weather.
 - a. Class 1 (plastic protected) or Class 2 (stainless steel protected) at all formed surfaces which will be exposed to view but not to weather.
 - b. Precast concrete blocks of strength equal to or greater than specified strength of concrete or Class 3 supports equipped with sand plates, where concrete will be cast against earth. Concrete masonry units will not be accepted.

2.3 CONCRETE MATERIALS

Portland Cement: ASTM C 150, Type I.

Ground Granulated Blast Furnace Slag Cement: ASTM C 989

Fly Ash: ASTM C 618, Type F.

Water: Potable

Aggregates: Normal weight concrete: ASTM C 33.
Class 1N.
Gradation as specified below under mix design.

- A. Admixtures - General: Admixtures which result in more than 0.1 percent of soluble chloride ions by weight of cement are prohibited.
- B. Air-Entraining Admixture: ASTM C 260 and certified by manufacturer for compatibility with other mix components.
- C. Water-Reducing Admixture: ASTM C 494, Type

2.4 GROUT MIXES FOR UNIT MASONRY

- A. Comply with ASTM C476. Use grout of consistency that will completely fill spaces intended to receive grout. Grout shall be 3,000 psi minimum and shall be capable of passing through a 1" diameter pump hose.

2.5 MISCELLANEOUS MATERIALS AND ACCESSORIES

- A. Waterstops, General: Provide waterstops at construction joints and as otherwise indicated, sized and configured to suit joints.
 - 1. Polyvinyl chloride waterstops: Corps of Engineers CRD-C 572.
- B. Vapor Retarder: Membrane for installation beneath slabs on grade, resistant to decay when tested in accordance with ASTM E 154, and as follows:
 - 6 mil polyethylene.
- C. Nonshrink Grout: ASTM C 1107.
 - Type: Provide nonmetallic type only.
- D. Burlap: AASHTO M 182, Class 2 jute or kenaf cloth.
- E. Moisture-Retaining Cover: ASTM C 171, and as follows:
 - 1. Curing paper.
 - 2. Polyethylene film.
 - 3. White burlap-polyethylene sheeting.
- F. Liquid Curing Compounds:
 - 1. Material - curing compounds: Comply with ASTM C 309, Type
 - a. Non-yellowing formulation where subject to ultraviolet light.
 - 2. Curing and sealing compound: Where indicated, provide curing and sealing formulation with long-lasting finish that is resistant to chemicals, oil, grease, deicing salts, and abrasion.
- G. Bonding Compound: Non-redispersable acrylic bonding admixture, ASTM C 1059, Type
- H. Epoxy Bonding Systems: ASTM C 881; type, grade and class as required for project conditions.

2.6 CONCRETE MIX DESIGN

- A. Review: Do not begin concrete operations until proposed mix has been reviewed and accepted by the Structural Engineer.
- B. Proportioning of Normal Weight Concrete: Comply with recommendations of ACI 211.1.
- C. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 - 1. Fly Ash plus Slag Cement: 25 percent

- D. Required Average Strength: Establish the required average strength $f'(cr)$ of the design mix on the basis of either field experience or trial mixtures as specified in ACI 301, and proportion mixes accordingly. If trial mixtures method is used, employ and independent testing agency acceptable to the Architect for preparing and reporting proposed mix design.
- E. Admixtures:
1. Air-entraining admixture: Add at rate to achieve specified air content.
Do not use in slabs-on-grade scheduled to receive topping, unless manufacturer of topping recommends use over air-entrained concrete.
 2. Water-reducing admixture: Add as required for placement and workability.
 3. Do not use admixtures not specified or approved.
- F. Design mix to meet or exceed each requirement specified. Where more than one criterion is specified, the most stringent shall apply. For example, a minimum cement content or maximum water-cement ratio may be required in order to achieve the required strength.
1. Specified compressive strength $F = (c)$ (ASTM C 39): 3,000 psi at 28 days Maximum water-cement ratio by weight: in accordance with ACI 318, Chapter 5.
 2. Maximum slump: 4" +/- 1".
 3. Maximum nominal size of coarse aggregate: As recommended in ACI 211.1.
 4. Total air content (ASTM C 173 or ASTM C 231): 3 percent.
- G. Mix adjustments: Provided that no additional expense to owner is involved, contractor may submit for Structural Engineer's approval requests for adjustment to approved concrete mixes when circumstances such as changed project conditions, weather or unfavorable test results occur. Include laboratory test data substantiating specified properties with mix adjustment requests.

2.7 CONTROL OF MIX IN THE FIELD

- A. Slump: A tolerance of up to 1 inch above that specified will be permitted for 1 batch in 5 consecutive batches tested. Concrete of lower slump than that specified may be used, provided proper placing and consolidation is obtained.
1. **No addition of water will be acceptable after initial batching of the concrete at the batching plant.**
- B. Do not use batches that exceed tolerances.

2.8 CONCRETE MIXING

- A. On-Site Equipment: Mix concrete materials in appropriate drum type batch machine mixer, in compliance with ASTM C 685. Mix each batch minimum of 1-1/2 minutes and maximum of 5 minutes before discharging concrete. Clean thoroughly at end of day and before changing concrete type.
- B. Transit Mixers: Mix concrete materials in transit mixers, complying with requirements of ASTM C 94.

PART 3 - EXECUTION

3.1 CONCRETE FORM PREPARATION

- A. General: Comply with requirements of ACI 301 for formwork, and as herein specified. The contractor is responsible for design, engineering, and construction of formwork, and for its timely removal.
- B. Earth Forms: Hand-trim bottoms and sides of earth forms to profiles indicated on the drawings. Remove loose dirt before placing concrete.
- C. Design: Design and fabricate forms for easy removal, without impact, shock, or damage to concrete surfaces or other portions of the work. Design to support all applied loads until concrete is adequately cured, within allowable tolerances and deflection limits.
- D. Construction: Construct and brace form work to accurately achieve end results required by contract documents, with all elements properly located and free of distortion. Provide for necessary openings, inserts, anchorages, and other features shown or otherwise required.
- E. Joints: Minimize form joints and make watertight to prevent leakage of concrete.
 - 1. Align joints symmetrically at exposed conditions.
- F. Chamfers: Provide chamfered edges and corners at exposed locations, unless specifically indicated otherwise on the drawings.
- G. Permanent openings: Provide openings to accommodate work of other trades, sized and located accurately. Securely support items built into forms; provide additional bracing at openings and discontinuities in formwork.
- H. Temporary openings: Provide temporary openings for cleaning and inspection in most inconspicuous locations at base of forms, closed with tight-fitting panels designed to minimize appearance of joints in finished concrete work.
- I. Tolerances for Formed Surfaces: Comply with minimum tolerances established in ACI 117, unless more stringent requirements are indicated on the drawings.
- J. Release Agent: Provide either form materials with factory-applied nonabsorptive liner or field-applied form coating. If field-applied coating is employed, thoroughly clean and recondition form work and reapply coating before each use. Rust on form surfaces is unacceptable.

3.2 VAPOR RETARDER INSTALLATION

- A. General: Place vapor retarder sheet over prepared base material, aligning longer dimension parallel to direction of pour and lapped 6 inches. Seal joints with appropriate tape.

3.3 PLACING REINFORCEMENT

- A. General: Comply with requirements of ACI 301 and as herein specified.
- B. Preparation: Clean reinforcement of loose rust and mill scale, soil, and other materials which adversely

affect bond with concrete.

- C. Placement: Place reinforcement to achieve not less than minimum concrete coverages required for protection. Accurately position, support, and secure reinforcement against displacement. Provide Class C tension lap splices complying with ACI 318 unless otherwise indicated. Do not field-bend partially embedded bars unless otherwise indicated or approved.
1. Use approved bar supports and tie wire, as required.
 2. Set wire ties to avoid contact with or penetration of exposed concrete surfaces.
 3. Tack welding of reinforcing is not permitted.
 4. Fibrous Reinforcing: For slab on grade concrete - install at a dosage of 1.5 pounds per cubic yard of concrete at time of initial batching of concrete.

3.4 JOINT CONSTRUCTION

- A. Construction Joints: Locate and install construction joints as indicated on drawings. If construction joints are not indicated, locate in manner which will not impair strength and will have least impact on appearance, as acceptable to the Architect.
1. Keyways: Provide keyways not less than 1-1/2 inches deep.
 2. Reinforcement: Continue reinforcement across and perpendicular to construction joints, unless details specifically indicate otherwise.
 3. Waterstops: Provide waterstops as indicated, installing to form continuous, watertight dam, with field joints fabricated in strict accordance with manufacturer's instructions.
- B. Control Joints: Construct contraction joints in slabs poured on grade to form panels of sizes indicated on drawings, but not more than 20 feet apart in either direction.
- C. Saw cuts: Form control joints by means of saw cuts one-fourth the depth of the slab, performed within 12 hours after slab finishing without dislodging aggregate.

3.5 INSTALLATION OF EMBEDDED ITEMS

- A. General: Set anchorage devices and other items required for other work connected to or supported by cast-in-place concrete, using templates, setting drawings, and instructions from suppliers of items to be embedded.
- B. Edge Forms and Screeds: Set edge forms and intermediate screeds as necessary to achieve final elevations indicated for finished slab surfaces.

3.6 CONCRETE PLACEMENT

- A. Inspection: Before beginning concrete placement, inspect form work, reinforcing steel, and items to be embedded, verifying that all such work has been completed.
1. Wood forms: Moisten immediately before placing concrete in locations where form coatings are not used.
- B. Placement - General: Comply with requirements of ACI 304 and as follows:
1. Schedule continuous placement on concrete to prevent the formation of cold joints.
 2. Provide construction joints if concrete for a particular element or component cannot be placed in continuous operation.
 3. Deposit concrete as close as possible to its final location, to avoid segregation.

- C. Placement in Forms: Limit horizontal layers to depths which can be properly consolidated, but in no event greater than 24 inches.
1. Consolidate concrete by means of mechanical vibrators, inserted vertical in freshly placed concrete in a systematic pattern at close intervals.
 2. Penetrate previously placed concrete to ensure that separate concrete layers are knitted together.
 3. Vibrate concrete sufficiently to achieve consistent consolidation without segregation of coarse aggregates.
 4. Do not use vibrators to move concrete laterally.
- D. Slab Placement: Schedule continuous placement and consolidation of concrete within planned construction joints.
1. Thoroughly consolidate concrete without displacing reinforcement or embedded items, using internal vibrators, vibrating screeds, roller pipe screeds, or other means acceptable to Architect.
 2. Strike off and level concrete slab surfaces, using highway straightedges, darbies, or bull floats before bleed water can collect on surface.
 3. Do not work concrete further until finishing operations are commenced.

3.7 FINISHING FORMED SURFACES

- A. Repairs - General: Repair surface defects, including tie holes, immediately after removing form work.
1. Remove honeycombed areas and other defective concrete down to sound concrete, cutting perpendicular to surface or slightly undercutting.
 2. Dampen patch location and area immediately surrounding it prior to applying bonding compound or patching mortar.
 3. Before bonding compound has dried, apply patching mixture matching original concrete in materials and mix except for omission of coarse aggregate, and using a blend of white and normal portland cement as necessary to achieve color match.
 4. Consolidate thoroughly and strike off slightly higher than surrounding surface.
- B. Unexposed Form Finish: Repair tie holes and patch defective areas. Rub down or chip off fins or other raised areas exceeding 1/4 inch height.
- C. Exposed Form Finish: Repair and patch defective areas, with fins or other projections completely removed and smoothed.
- D. Smooth rubbed finish: Apply to surfaces indicated no later than 24 hours after form removal.
1. Wet concrete surfaces to be finished and rub with Carborundum brick or other abrasive until uniform color and texture are achieved.
 2. Do not apply separate grout mixture.
- E. Contiguous unformed surfaces: Strike smooth and float to a similar texture tops of walls, horizontal offsets, and other unformed surfaces. Continue final finish of formed surfaces across unformed surfaces, unless otherwise specifically indicated.

3.8 FINISHING SLAB

A. Finishing Operations - General:

1. Do not directly apply water to slab surface or dust with cement.
2. Use hand or powered equipment only as recommended in ACI 302.1R.
3. Screeding: Strike off to required grade and within surface tolerances indicated. Verify conformance to surface tolerances. Correct deficiencies while concrete is still plastic.
4. Bull Floating: Immediately following screeding, bull float or darby before bleed water appears to eliminate ridges, fill in voids, and embed coarse aggregate. Recheck and correct surface tolerances. Do not perform subsequent finishing until excess moisture or bleed water has disappeared and concrete will support either foot pressure with less than 1/4 inch indentation or weight of power floats without damaging flatness.
5. Final Floating: Float to embed coarse aggregate, to eliminate ridges, to compact concrete, to consolidate mortar at surface, and to achieve uniform, sandy texture. Recheck and correct surface tolerances.

- B. Coordinate appearance and texture of required final finishes with the Architect before application.
1. Apply final finishes in the locations indicated on the drawings.

C. Float Finish: As specified above.

D. Slab Surface Tolerances:

1. Achieve flat, level planes except where grades are indicated. Slope uniformly to drains.

E. Floated finishes: Depressions between high spots shall not exceed 5/16 inch under a 10 foot straightedge.

F. Repair of Slab Surfaces: Test slab surfaces for smoothness and to verify surface plane to tolerance specified.

G. Repair defects as follows:

1. High areas: Correct by grinding after concrete has cured for not less than 14 days.
2. Low areas: Immediately after completion of surface finishing operations, cut out low areas and replace with fresh concrete. Finish repaired areas to blend with adjacent concrete. Proprietary patching compounds may be used when approved by the Architect.

H. Craze or cracked areas: Cut out defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts. Dampen exposed concrete and apply bonding compound. Mix, place, compact and finish patching concrete to match adjacent concrete.

I. Isolated cracks and holes: Groove top of cracks and cut out holes not over 1 inch in diameter. Dampen cleaned concrete surfaces and apply bonding compound; place dry pack or proprietary repair compound acceptable to Architect while bonding compound is still active:

1. Dry-pack mix: one part portland cement to 2-1/2 parts fine aggregate and enough water as required for handling and placing.
2. Install patching mixture and consolidate thoroughly, striking off level with and matching surrounding surface. Do not allow patched areas to dry out prematurely.

3.9 CONCRETE CURING AND PROTECTION

A. General:

1. Prevent premature drying of freshly placed concrete, and protect from excessively cold or hot temperatures until concrete has cured.
2. Provide curing of concrete by one of the methods listed and as appropriate to service conditions and type of applied finish in each case.

B. Curing Period:

1. Not less than 7 days for standard cements and mixes.

C. Formed Surfaces: Cure formed concrete surfaces by moist curing with forms in place for full curing period or until forms are removed.

1. Keep wooden or metal forms moist when exposed to heat of the sun.
2. If forms are removed prior to completion of curing process, continue curing by one of the applicable methods specified.

D. Surfaces Not in Contact with Forms:

1. Start curing as soon as free water has disappeared, but before surface is dry. Place to protect adjacent concrete edges. Acceptable curing methods:
 - a. Water ponding.
 - b. Water-saturated sand.
 - c. Water-fog spray.
 - d. Saturated burlap: provide 4-inch minimum overlap at joints.

E. Moisture-retaining cover: Lap not less than 3-inches at edges and ends, and seal with waterproof tape or adhesive. Repair holes or tears during curing period with same tape or adhesive. Maintain covering in intimate contact with concrete surface. Secure to avoid displacement.

1. Extend covering past slab edges at least twice the thickness of the slab.
2. Do not use plastic sheeting on surfaces which will be exposed to view when in service.

F. Curing compound: Apply at rate stated by manufacturer to conform with moisture-retention requirements specified, using second, immediate application at right angles to first, if necessary, and reapply if damaged by rain.

G. Curing and sealing compound: Apply at rate stated by manufacturer to conform with moisture-retention requirements specified, using second, immediate application at right angles to first, if necessary, and reapply if damaged by rain. Apply additional coat near substantial completion to act as sealer.

1. Use curing compounds only in locations permitted or required. Do not apply to surfaces to receive other finishes, coating, or coverings.

H. Avoid rapid drying at end of curing period.

3.10 SHORES AND SUPPORTS

A. General: Comply with recommendations of ACI 347 for shoring and reshoring in multistory construction.

- B. Low-Rise Construction: Extend shoring from ground to roof.
- C. Reshoring: Remove shores and reshore in a planned sequence, to avoid damage to partly cured concrete. Locate and provide adequate reshoring to safely support work without excessive stress or deflection.

3.11 REMOVAL OF FORMS AND SUPPORTS

- A. Non-Load-Bearing Form Work: Provided that concrete has hardened sufficiently that it will not be damaged, forms not actually supporting weight of concrete or weight of soffit forms may be removed after concrete has cured at not less than 50 degrees F for 24 hours. Maintain curing and protection operations after form removal.
- B. Load-Bearing Form Work: Do not remove shoring and forms supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, until concrete has attained 75 percent of specified compressive strength. In addition, the contractor shall have determined that the actual compressive strength attained is adequate to support the weight of the concrete and superimposed loads.
- C. Keep reshores in place a minimum of 15 days after placing upper tier, and longer if required, until concrete has attained 100 percent of specified compressive strength. In addition, the contractor shall have determined that the actual compressive strength attained is adequate to support the weight of the concrete and superimposed loads.
- D. Keep supports in place until heavy loads due to construction operations have been removed.
- E. Test field-cured specimens to determine potential compressive strength of concrete for specific locations.

3.12 MISCELLANEOUS CONCRETE ITEMS

- A. Fill-in: Fill in holes and openings left in concrete structures for passage of work by other trades after such work is in place. Place such fill-in concrete to blend with existing construction, using same mix and curing methods.
- B. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as indicated on drawings. Set anchor bolts at correct elevations, complying with diagrams or templates of equipment manufacturer.
 - 1. Grout base plates and foundations as indicated with nonshrink grout.
 - 2. Use nonmetallic grout for exposed conditions, unless otherwise indicated.

3.13 CONCRETE REPAIRS

- A. Perform cosmetic repairs of concrete surfaces as specified under concrete application.
- B. Perform structural repairs with prior approval of the Architect for method and procedure, using epoxy bonding systems. The Architect's approval is required for repair methods using materials other than those specified.

3.14 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. Concrete: Composite Sampling and Making and Curing of Specimens: ASTM C 172 and ASTM C 31.
 - 1. Take samples at point of discharge.
 - 2. For pumped concrete, perform sampling and testing at the frequencies specified herein at point of delivery to pump, and perform additional sampling and testing at the same frequency at discharge from line. Results obtained at discharge from line shall be used for acceptance of concrete.
- B. Slump: ASTM C 143. One test per strength test and additional tests if concrete consistency changes. Modify sampling to comply with ASTM C 94.
- C. Air Content of Normal Weight Concrete: ASTM C 173 or ASTM C 231. One test per strength test performed on air-entrained concrete.
- D. Concrete Temperature:
Test each time a set of strength test specimens is made.
- E. Compressive Strength Tests: ASTM C 39.
 - 1. Compression test specimens: Mold and cure one set of 4 standard cylinders for each compressive strength required.
 - 2. Testing for acceptance of potential strength of as-delivered concrete: Obtain samples on a statistically sound, random basis.
 - 3. Minimum frequency:
 - a. One set per 100 cubic yards or fraction thereof for each day's pour of each concrete class.
 - b. One set per 3500 square feet of slab or wall area or fraction thereof for each day's pour of each concrete class.
 - c. When the above testing frequency would provide fewer than 5 strength tests for a given class of concrete during the project, conduct testing from not less than 5 randomly selected batches, or from each batch if fewer than five.
 - 4. Test one specimen per set at 7 days for information unless an earlier age is required.
 - 5. Test 2 specimens per set for acceptance of strength potential; test at 28 days unless other age is specified. The test result shall be the average of the two specimens. If one specimen shows evidence of improper sampling, molding, or testing, the test result shall be the result of the remaining specimen; if both show such evidence, discard the test result and inform the Architect.
 - 6. Retain one specimen from each set for later testing, if required.
 - 7. Strength potential of as-delivered concrete will be considered acceptable if all of the following criteria are met.
 - a. No individual test result falls below specified compressive strength by more than 500 psi.
 - b. Not more than 10 percent of individual test results fall below specified compressive strength f'_c .
 - c. Average of any 3 consecutive strength test results equals or exceeds specified compressive strength f'_c .
 - 8. Evaluate construction and curing procedures and implement corrective action when strength results for field-cured specimens are less than 85 percent of test values for companion laboratory-cured specimens.

- F. Removal of forms or supports: Mold additional specimens and field-cure with concrete represented; test to determine strength of concrete at proposed time of form or support removal.
- G. Test Results: Testing agency shall report test results in writing to Architect and contractor within 24 hours of test. Test reports shall contain the following data:
1. Project name, number, and other identification.
 2. Name of concrete testing agency.
 3. Date and time of sampling.
 4. Concrete type and class.
 5. Location of concrete batch in the completed work.
 6. All information required by respective ASTM test methods.
- H. Nondestructive testing devices such as impact hammer or sonoscope may be used at Structural Engineer's and/or Architect's option for assistance in determining probable concrete strength at various locations or for selecting areas to be cored, but such tests shall not be the sole basis for acceptance or rejection.
1. The testing agency shall make additional test of in-place concrete as directed by the Architect when test results indicate that specified strength and other concrete characteristics have not been attained.
 2. Testing agency may conduct tests of cored cylinders complying with ASTM C 42, or tests as directed.
 3. Cost of additional testing shall be borne by the contractor when unacceptable concrete has been verified.
- I. Grout: Test grout compressive strength per ASTM C 1019 for each 2,000 square feet of wall area or portion thereof.

END OF SECTION 03300

THIS PAGE LEFT INTENTIONALLY BLANK

SECTION 133419 – PREFABRICATED METAL BUILDINGS

PART 1 -- GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
 - 1. Section 022820 - Termite Control
 - 2. Section 033000 – Cast-in-Place Concrete
 - 3. Section 323113 – Chain Link Fencing
 - 4. Section 329300 - Landscaping

1.2 CONTRACTOR SUBMITTALS

- A. General: Furnish submittals in accordance with Section 013300 - Contractor Submittals.
- B. Shop Drawings
 - 1. Drawings and cut sheets shall be provided to the department for approval with bid to ensure the proposed building meets specifications.
 - a. Contractor shall submit complete signed and sealed shop drawings by a Florida registered Engineer with attached details and reactions to ensure footing are designed to meet required loads for the selected pre-fabricated building.

1.2 PERFORMANCE REQUIREMENTS:

- A. Cooperate with regulatory agencies or authority and provide data as requested by authority having jurisdiction.
- B. Manufacturer Qualifications: Company specializing in manufacturing prefabricated structures with a quality assurance program.

1.3 WARRANTY:

- A. Provide a minimum of one (1) year manufacturer's warranty on products to be free of leaks and defects in material and workmanship.
- B. Provide manufacturer's warranties on all accessory items provided, such as, but not limited to, HVAC system, lights, towers and handling system.
- C. Note: Warranty term begins on the date of acceptance by this department.

PART 2 - PRODUCTS

2.1 PREFABRICATED ALUMINUM BUILDING: EXTERIOR MATERIALS

- A. Size: one (1) equipment shelter 8' wide, 8' high, 12' long.
- D. Roof:
 - 1. One (1) 8' x 8' x 24" above finished roof (max.) aluminum roof platform including slip resistant grating, aluminum railing.
 - 2. Rubber Membrane Roof
 - 3. Aluminum Roof Grating, 1"H - Slip Resistant, covering 8'x8' area.
 - 4. Aluminum Modular Roof Railing System. Meets OSHA Specifications. Includes 8'x8' roof area railing system with toe-plate. System is removable for ease of transport.
- E. Doors:
 - 1. Entrance door, minimum 36", insulated and equipped with hydraulic door closer, keyed door handle and deadbolt lock
 - 2. Awning over entrance door.
 - 3. Deadbolt lock in access door, installed and keyed same as door lock
- F. Hurricane tie down brackets as required by industry standards and applicable requirements.
- G. Exterior light beside door with photocell.
- H. Titanium Dioxide Waterproofing Agent
- I. Aluminum Railing Bracket for Mounting PM2.5 Sampler on Roof Railing, Allows for instruments to mount outside of the perimeter of the roof. Quantity two (2).

2.2 PREFABRICATED ALUMINUM BUILDING: INTERIOR MATERIALS

- A. Stud-less wall construction
- B. Fiberglass reinforced interior finish (white)
- C. Vinyl flooring, seamless and slip resistant.
- D. Insulation in wall, floor and ceiling R25 equivalent.

2.3 PREFABRICATED ALUMINUM BUILDING: BUILDING ACCESSORIES

- A. One (1) Aluminum staircase up the side of the shelter with one (1) additional aluminum staircase from finished roof area of the shelter, to the top of the 8' x 8' x 24" high platform. Includes railings.
- B. Platforms

1. Two (2) PM2.5 platforms with each inside the perimeter of the roof platform and a minimum of one meter apart and a minimum of one meter from the PM2.5 roof access opening.
 2. One probe to be telescoping in order to be easily lowered and cleaned, this inlet must contain suitable sampling lines compliant with USEPA guidance as well as a sampling inlet that allows for through the probe calibration and audit.
 3. Second probe will be stationary and be easily removed from inlet to be cleaned.
 4. Provide reinforcement brackets as required to achieve required height as determined by the E.P.A for both brackets.
 5. The roof penetrations must be manufactured of Aluminum with appropriately sized compression style fittings preinstalled as well as compression fittings for any support equipment/signals, etc.
 6. Each inlet must be installed in the appropriate position to allow the proper installation of the analyzer in the instrumentation rack.
 7. Sampling inlets must be designed to eliminate condensation in the sample lines/inlets.
- C. Work desk/bench
8. Located on one end of shelter
 9. Size: 96”L x 24”D
 10. Covered with heat and scratch resistant laminate
 11. Equipped with storage 48” of storage under the counter.
 12. The rest of the under counter length will function as leg room while working at a computer
- D. Two (2) instrument racks – minimum 24”W x 30” D x 75” H,
1. Open frame type steel (painted)
 2. Includes wire/tubing management system
 3. Racks shall be installed at location specified by the department when purchased
 4. Each rack shall be fabricated to hold a BAM PM2.5 monitor on the top shelf with a minimum distance of one (1) meter between roof accesses for the sample probe.
- E. Two (2) penetrations 2” ID with flange cap.
1. Holes shall be installed at location specified the department when purchased)
- F. Additional signal cable box for instruments on the roof.
- G. HVAC System:
1. Minimum BARD 12,000 BTU A/C Unit with 3Kw heater and high efficiency rotary compressor.
 2. To be mounted on exterior reinforced on wall.
 3. Wall mounted digital thermostat with automatic switchover between heating and cooling.
 4. Automatic condensate disposal system.
 5. 240V 1PH 20A Hardwired
 6. Auto-switching thermostat installed
 7. Green Refrigerant R-410A – Non ozone depleting
- H. Electrical:
1. Meets or exceeds NEC regulations.
 2. Minimum 100 amp/240 V single phase service with surge protection. Panel circuit breakers to be labeled.
 3. 100 A 240 V External Disconnect
 4. Metal Electrical raceway for power hook up

5. Minimum four ceiling mounted 48” LED tube lights with diffusers to provide minimum 500 lux. Switch at entry door.
 6. Four 120V, single phase, 20 A electrical outlets placed along walls.
 7. Two 120V, single phase, 20 A electrical outlets placed on ceiling to service instrument racks.
 8. Two 120V, single phase, 20 A electrical outlets placed along workbench/desk.
 9. One 120V, single phase, 20 A with GFCI electrical outlet placed on exterior.
 10. Two 120V, single phase, 20 A with GFCI electrical outlet placed on roof rack.
 11. One of the electrical connections to the instrument rack has the provision to be supplied by connecting to a UPS.
 12. Premium SquareD Electrical Components
- I. Meteorological Tower
1. Mounting Bracket for tower, aluminum, removable, installed. Allows for mounting tower directly onto the shelter without pouring concrete tower foundation.
 2. Cross arm for mounting meteorological sensors on the tower, includes mounting bracket, each.
 3. Tower Lightning protection & grounding kit, each.
 4. Met Sensor Surge Protection Device, RS-232/Analog Capable, installed in signal box, Quantity 2.
 5. Exterior Signal Cable Box, Water-proof. 6”x6”x4”. Allows for signal cable entry/termination. Installed near tower.
- H. Sample Handling System
1. Sampling System - Teflon analyzer inlet with raincap and audit port. Must meet US EPA requirements.
 2. Teflon sample distribution manifold in heated enclosure. Manifold to include 4 ports (1/4”), one 1/2” port and include Teflon compression fittings, installed
 3. Exhaust manifold, floor mounted. Includes PVC manifold with six quick release ports. Installed.
- I. Other
1. One 10 meter aluminum tower, heavy duty, crank-up type, connected to the equipment shelter or concrete pad. Must be able to withstand 75 mile per hour winds.
- 2.4 FABRICATION
- A. Fabricate factory built, prefabricated structures completely in factory.
 - B. Preglaze windows and doors at factory.
 - C. Prewire factory built, prefabricated structures and shelters at factory, ready for connection to service at Project site.
 - D. Separate dissimilar materials using nonconductive tape, paint, or other material not visible in finished work.
 - E. Provide factory built, aluminum skid base with fork-lift lifting points and four crane listing points integrated into shelter skid base.

2.5 FINISHES

- A. Comply with National Association of Architectural Metal Manufacturers (NAAMM) "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

PART 3 -- EXECUTION

3.1 SITE INSTALLATION AND DELIVERY

- A. This shall include delivery, load off, and any site preparation (excluding ground preparation) for the shelter installation at the specified site.
- B. The shelter shall be installed to meet local building requirements.
- C. The awarded bidder shall supply required drawings and paperwork necessary to secure local permits.

3.2 ELECTRICAL

- A. Electrical connection to the shelter will be provided by the contractor. Coordinate proposed new hand-hole location with FPL prior to start of project.

3.3 GENERAL REQUIREMENTS

- A. Prepare and provide signed and sealed engineered drawings for proposed pre-fabricated building as described in 2014 5th Addition Florida Building Code or latest and submit as noted. Plans and material specifications must be reviewed and approved by the Health Department prior to permitting.
- B. If necessary, provide legal survey.
- C. Obtain necessary permits (e.g., Building, electrical, etc.) for the construction/installation of the AMS.
- D. Designed by LEEP AP to maximize energy efficiency and environmental sustainability.
- E. Construct Concrete Slab to accommodate stairs which will go along one side of the shelter which is 8'X 12' and at least 1' around the shelter. In the section where there is a staircase the slab should abut at least 1' out from the staircase.
- F. Grade 18'X20' Area inside fence and install 4" of #57 Gravel
- G. Includes Termite Treatment; refer to Section 022820.

- H. Fence:
 - 1. Refer to Section 323113
 - 2. Install Fence to meet requirement of the City of Royal Palm Beach which is attached.
 - 3. The trailer will be 8'X12'.
 - 4. On the door side of the shelter the fence needs to accommodate a 36" door.
 - 5. The setback in the rendering was 5'.

- I. Landscape:
 - 1. Refer to Section 329300
 - 2. Provide landscape around the fence to cover the fence.
 - 3. The contractor shall attempt to use landscape that is low-maintenance, drought-tolerant, and Florida-native approved by the Health Department prior to planting.
 - 4. Provide landscape sprinkler irrigation if required.
 - a. If required, investigate connection to existing sprinkler system for the site.
 - b. If not, propose landscape with minimum water usage.

- J. Provide underground Electrical shelter to the shelter. Contractors may want to visit the site to provide the quote. The meter will be located within the fence enclosure as shown on architectural plans.

- K. Connect AMS to meter supplied by others.

- L. The contractor shall leave the project site clean of debris and restored to match or exceed existing conditions.

END OF SECTION

SECTION 323113 – CHAIN LINK FENCING

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- A. The Prime Contractor shall provide chain link fencing and gates and appurtenant WORK, complete and operable, in accordance with the Contract Documents.
- B. Single Manufacturer: Chain link fencing, gates, accessories, fittings, and fastenings shall be products of a single manufacturer.

1.2 CONTRACTOR SUBMITTALS

- A. General: Furnish submittals in accordance with Section 013300 - Contractor Submittals.
- B. Shop Drawings
 - 1. Manufacturer's technical data, product specifications, standard details, certified product test results, installation instructions and general recommendations.
 - 2. Scale layout of fencing, gates, and accessories. Drawings shall show fence height, post layout, including sizes and sections; post setting and bracing configuration, details of gates and corner construction, barbed wire support arms; and other accessories which may be necessary.

PART 2 -- PRODUCTS

2.1 GENERAL

- A. Dimensions indicated herein for roll-formed pipe and H-sections are outside dimensions, excluding coatings.
- B. Fence fabric height shall be six (6) feet unless otherwise indicated.
- C. Fencing materials shall be hot-dip galvanized after fabrication.

2.2 STEEL FABRIC

- A. Fence fabric shall be No. 9 gauge steel wire, 2-inch mesh, with top selvages knuckled and bottom selvages twisted and barbed.
- B. Fabric Finish: Fabric shall be galvanized in conformance with ASTM A 392 - Zinc- Coated Steel Chain Link Fence Fabric, Class II, with not less than 2.0 ounces zinc per square foot of coated surface.

2.3 FRAMING AND ACCESSORIES

- A. Steel Framework, General: Unless otherwise indicated, framework components shall be fabricated of galvanized steel conforming to ASTM A 53 - Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless, or ASTM A 123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products, with not less than 1.8 ounces zinc per square feet of coated surface.
 - 1. Fittings and accessories shall be galvanized in accordance with ASTM A 153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware, with zinc weights per Table I of that standard, except that no coating shall be less than 1.8-ounce zinc per square foot of coated surface.
- B. End, Corner and Pull Posts: Posts shall be one-piece without circumferential welds, 3- inch schedule 40 pipe, 5.79 pounds per linear foot.
- C. Line Posts: Line posts shall be spaced no more than 10-feet on center and shall be 2- 1/4 inch “H” column section, 4.1-pounds per linear foot, or schedule 40, 2-1/2 inch pipe, 3.65-pounds per linear foot.
- D. Gate Posts: Gate posts shall be 4-inch schedule 40 pipe, 9.1-pounds per linear foot.
- E. Top and Bottom Rails: Top and bottom railings shall be provided in manufacturer’s longest lengths, with expansion type couplings, approximately 6 inches long, for each joint. Fence design shall provide positive, secure attachment of top and bottom rails to each gate post, corner post, pull post and end post. Top and bottom rails and braces shall be 1-5/8 inch schedule 40 pipe, 2.27-pounds per linear foot, or 1-1/2 inch “H” column section, 2.00-pounds per linear foot.
- F. Fabric Tie Wires: Fabric tie wires shall be No. 9 gauge galvanized steel wire of the same finish as the fabric. Aluminum ties shall not be used. Ties shall be spaced 14- inches apart on posts and 24-inches apart on rails.
- G. Post Brace Assembly: Post brace assembly shall be manufacturer’s standard adjustable brace assembly provided at each end post, gate post and at both sides of each corner post and intermediate brace post. Material used for brace shall be same as top rail. Truss bracing between line posts shall be achieved with 0.375-inch diameter rod and adjustable tensioner.
- H. Post Tops: Post tops shall be weather-tight closure caps, designed for containment of top rail and positive permanent attachment to post. One cap shall be provided for each post.
- I. Stretcher Bars: Stretcher bars shall be one-piece lengths equal to the full height of the fabric, with minimum cross-section of 3/16-inch by 3-1/2 inch. One stretcher bar shall be provided for each gate and end post, and 2 for each corner and intermediate brace post.
- J. Stretcher Bar Bands: Stretcher bar bands shall be one-piece fabrications designed to secure stretcher bars to end, corner, intermediate brace, and gate posts. Bands shall have a minimum cross-section of 1/8-inch by 3/4-inch. Stretcher bar bands shall be spaced no more than 15-inches on center.

2.4 GATES

- A. Fabrication: Perimeter frames of gates shall be fabricated from same metal and finish as fence framework. Gate frames shall be assembled by welding or with fittings and rivets for rigid,

secure connections. Welds shall be ground smooth. Gate frames and any ungalvanized hardware, shall be hot-dip galvanized after fabrication. Horizontal and vertical members shall be provided to ensure proper gate operation and attachment of fabric, hardware and shall be hot-dip galvanized after fabrication.

1. Fabric for gates shall match fence fabric, unless otherwise indicated. Fabric shall be installed with stretcher bars at all perimeter edges. Stretcher bars shall be attached to gate frame with stretcher bar bands spaced no more than 15 inches on center.
 2. Each gate shall be diagonally cross-braced with a 3/8-inch diameter adjustable length truss rod to ensure frame rigidity without sag or twist.
 3. Where barbed wire is indicated above gates, vertical members shall be extended and fabricated as required to receive barbed wire supporting arms.
- B. Swing Gates: Perimeter frames of swing gates shall be constructed of the same pipe or “H” column members as the top rails and shall be fabricated by welding. Welds shall be ground smooth prior to hot-dip galvanizing.
1. Hardware and accessories shall be provided for each gate, galvanized in conformance with ASTM A 153, and in accordance with the following:
 - a. Hinges: Hinges shall be of size and material to suit gate size, non-lift-off type, offset to permit 180-degree gate opening. Three hinges shall be provided for each leaf 6-feet or more in height.
 - b. Latch: Latch shall be forked type or plunger-bar type, permitting operation from either side of the gate, with padlock eye as an integral part of the latch.
 - c. Keeper: Keeper shall be provided which automatically engages the gate leaf and holds it in the open position until it is manually released.
 - d. Double Gates: Gate stops shall be provided for double gates, consisting of mushroom type flush plate with anchors, set in concrete, and designed to engage center drop rod or plunger bar. Locking device and padlock eyes shall be provided as an integral part of the latch, permitting both gate leaves to be locked with a single padlock.
- C. Sliding Gates: Sliding gates shall be track guided type, engineered and designed specifically for the opening size and opening direction. Construction and coating shall be the same as for swing gates. The gate components shall be engineered for proper frame and bracing size, and shall be provided complete with all necessary overhead framing, supports, guides, stays, bracing, track foundations, hardware, heavy duty rollers with roller or ball bearings, and accessories as required. Hanger sheaves shall be heavy duty type with roller or ball bearings.
1. Sliding gates shall be engineered for a wind load of at least 25 lb/sq.ft. and maximum deflection of 1/160 of the full span with a 200 lb live load at the free end.

2.5 CABLE ARRESTORS

- A. Cable arrestors shall be provided where shown on the plan. Cable arrestors shall be constructed of two lengths of galvanized 3/4-inch diameter steel wire rope, each connected to a buried concrete anchor block. The arrestor cables shall be arranged and attached to the fence 3 feet above grade up to and on the gate leaves. A cable eye shall be provided for each arrestor

cable so that the ends of the two cables can be locked at each gate when the leaves are closed.

2.6 RELATED ITEMS

- A. Concrete: Concrete shall be provided according to Section 033100 - Cast-In-Place Concrete.
- B. Nuts, bolts and screws shall be steel, minimum size 3/8-inch diameter, hot-dip galvanized after fabrication.

2.7 MANUFACTURERS

- A. Manufacturer's Qualifications: Chain link fencing and gates shall be products of a single manufacturer which has been successfully engaged in the production of such items for a period of at least 5 years.
- B. Installer's Qualifications: Installation of the chain link fence shall be by the manufacturer or by a firm accepted and licensed by the manufacturer.
- C. Manufacturers, or equal
 - 1. American Fence Corp.
 - 2. Anchor Fence, Inc.
 - 3. United States Steel

PART 3 -- EXECUTION

3.1 INSPECTION

- A. Prior to commencing installation, require Installer to inspect all areas and conditions within which WORK of this Section will be performed. Dimensions and clearances shall be verified. Final grading shall be completed and all earth, brush, or other obstructions which interfere with the proper alignment and construction of fencing shall be removed.

3.2 INSTALLATION

- A. General: Unless otherwise indicated, all posts shall be set in concrete. Gate and related posts, corner posts, and other critical elements shall be provided with concrete foundations which are designed by an engineer to safely accommodate the loads to which they will be subjected.
- B. Excavation: Holes for posts shall be drilled or hand excavated to the diameters and spacings indicated, in firm, undisturbed or compacted soil. Post foundations which are not designed by an engineer shall comply with the following:
 - 1. Holes shall be excavated to a diameter not less than 12 inches or not less than 5 times the largest dimension of the item being anchored, whichever is larger.
 - 2. Depth for holes shall be not less than 40 inches; excavated approximately 4 inches lower than the post bottom, with bottom of posts set not less than 36 inches below finish grade surface.

- C. Setting Posts: Line posts shall be spaced at not more than 10-foot intervals, measured from center to center of the posts, parallel to the ground slope. Posts shall be set plumb and shall be centered in holes, 4 inches above the bottom of the excavation, with posts extending not less than 36 inches below finish grade surface.
1. Corner posts shall be installed where changes in the fence lines equal or exceed 15 degrees, measured horizontally.
 2. Each post shall be properly aligned vertically and its top aligned parallel to the ground slope. Posts shall be maintained in proper position during placement and finishing operations.
- D. Concrete
1. Concrete for footings may be placed without forms, providing the ground is firm enough to permit excavation to neat line dimensions. Prior to placing concrete, the earth around the hole shall be thoroughly moistened.
 2. Encasement concrete for footings shall be placed immediately after mixing in a manner such that there will be no concentration of the large aggregates. The concrete shall be consolidated by tamping or vibrating.
 3. Concrete footings shall have a neat appearance and shall be extended 2 inches above grade and troweled to a crown to shed water.
 4. A minimum of 7 days shall elapse after placing the concrete footings before the fence fabric or barbed wire is fastened to the posts.
- E. Bracing: Bracing shall be provided at all ends, corners, gates, and intermediate brace posts. Corner posts and intermediate brace posts shall be braced in both directions. Horizontal brace rails shall be set midway between the top rail and the ground, running from the corner, end, intermediate brace or gate post to the first line post. Diagonal tension members shall connect tautly between posts below horizontal braces.
1. Braces shall be so installed that posts remain plumb when diagonal rod is under proper tension.
- F. Intermediate Brace Posts: Where straight runs of fencing exceed 500 feet, intermediate brace posts shall be installed, spaced equally between ends or corners; with additional posts provided as required, such that the spacing between intermediate brace posts does not exceed 500 feet. Intermediate brace posts shall be equivalent in size to corner posts and shall be braced with horizontal brace rails and diagonal tension members in both directions.
- G. Top Rails: Top rails shall be run continuously through post caps, bending to radius for curved runs. Expansion couplings shall be provided as recommended by the fencing manufacturer.
- H. Center Rails: Center rails shall be provided where indicated. Rails shall be installed in one piece, between posts and flush with posts on fabric side, using special offset fittings where necessary.
- I. Bottom Rails: Bottom rails shall be provided. Rails shall be installed in one piece, between posts and flush with posts, using special offset fittings where necessary. Bottom rails shall be

installed on a straight grade between posts, with 2 inches maximum and 1/2 minimum space between finish grade and bottom selvage, unless otherwise indicated.

J. Fabric

1. Chain-link fabric shall be fastened on the secured side of the posts.
2. Fabric shall be stretched and securely fastened to posts. Between posts, top and bottom edges of the fabric shall be fastened to the top rail and bottom rail, respectively.
3. Fabric shall be stretched and anchored in such a manner that it remains in tension after the pulling force is released.

K. Tie Wires: Tie wire shall be bent to conform to the diameter of the pipe to which it is attached, clasping pipe and fabric firmly with ends twisted at least two full turns. Ends of wire shall be bent back to minimize hazard to persons or clothing.

1. Fabric shall be tied to line posts with tie wires spaced at 12 inches on center.
2. Fabric shall be tied to rails and braces with tie wires spaced at 24 inches on center.
3. Fabric shall be tied to tension wires, with hog rings spaced 24 inches on center.

L. Stretcher Bars: Fabric shall be fastened to end, corner, intermediate brace, and gate posts with stretcher bars. Bars shall be threaded through or clamped to fabric at 4 inches on center and secured to posts with stretcher bar bands spaced no more than 14 inches on center.

M. Fasteners: Nuts for tension bands and hardware bolts shall be installed on the side of fence opposite the fabric side. Ends of bolts shall be peened or the threads scored to prevent removal of nuts.

N. Galvanized coating damaged during construction of the fencing shall be repaired by application of Galvo-Weld; Galvinox; or equal.

END OF SECTION

SECTION 329300 - LANDSCAPING

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- A. The CONTRACTOR shall provide landscaping and appurtenant work, complete and in place, in accordance with the Contract Documents. The requirements of this section shall apply to all landscaping work within the Air Monitor Station site boundary.

1.2 DEFINITIONS

- A. The terms "plant material" or "plants" refer to all vegetation, whether trees, shrubs, ground cover, or herbaceous vegetation.
- B. "Quality" refers to structure and form, as evidenced by density and number of canes and branches, compactness, symmetry, and general development without consideration of size or condition. All plant material furnished by the landscape contractor unless otherwise specified shall be Florida No. 1 or better and shall be installed as specified in grades and standards for nursery plants, State Plant Board of Florida. Plants shall be nursery grown.
- C. "Specimen" means an exceptionally heavy, symmetrical, tightly-knit plant, so trained or favored in its development and appearance as to be outstanding, superior in form, number of branches, compactness, and symmetry.
- D. "Size" is the factor controlled by dimensions representing height or spread, or both, without consideration of quality or conditions. For standard quality, a dimension is given for height or container size, or a dimension is given for height as well as container size.
- E. "Height" is usually indicated with a tolerance. The smaller dimension is the minimum acceptable. The larger dimension represents the maximum permissible. The average dimension of all plants shall equal the average of the tolerance figures for each item.
- F. "Condition" is the factor controlled by vitality and ability to survive and thrive and be comparable with normal plants of the same species and variety in the vicinity at the same season of the year. Plants shall be free from physical damage or adverse conditions that would prevent thriving. "Condition" also sometimes refers to state of growth, i.e., whether "dormant condition" or "growing condition" and this state shall be comparable to plants of similar species in the vicinity for leaves, formation of buds, and the like.
- G. "Cane" means a primary stem which starts from the ground, or close to the ground, at a point not higher than 1/4 the height of the plant.
- H. "Caliper" shall be measured 12 inches above the finish grade or ground, as a guide, or where the trunk appears to form the head of the tree.
- I. "Foliage line" is maximum dimension in case of specimen plants. It measures from ground to lowest part of body of plant.

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Commercial Standards

ASTM D 422	Method for Particle-Size Analysis of Soils
ANSI Z60.1	Nursery Stock
American Association of Nurserymen, Inc.	Rules and Grading Provisions

1.4 CONTRACTOR SUBMITTALS

A. General: Submittals shall be furnished in accordance with Section 013300 - Contractor Submittals.

B. Product Information

1. Manufacturer's product information on fertilizer, peat moss, mulch, sod, and tree paint.
2. Topsoil Analysis Report: A report certified by an analytical laboratory which shows results of analyzing representative samples of topsoil proposed for use. Approval of the report does not constitute final acceptance of the topsoil.

C. Certificate

1. Certificates shall accompany each delivery stating source, quantity, and type of material. All certificates shall be submitted at the time of delivery.
2. Certificates of inspection of plant material, as may be required by Federal, State, or other authorities having jurisdiction, which accompany the shipment, shall be submitted at delivery.
3. Landscaping Subcontractor guarantee to perform planting maintenance services during the one year correction of defects period.

1.5 QUALITY ASSURANCE

A. General: All plants shall be true to type or name as indicated in the Contract Documents and shall be tagged in accordance with the standard practice recommended by the State of Florida.

B. All plants shall comply with Federal and State laws requiring inspection for plant diseases and infestations.

C. Inspections will be made by the Owner or its representative. The CONTRACTOR shall request inspection at least 24 hours in advance of the time inspection is required. Inspection is required on the following stages of the WORK:

1. During preliminary grading, soil preparation, and initial weeding.
2. When finish grading has been completed.

- 3. When all WORK except the maintenance period has been completed.
- 4. Final inspection at the completion of the maintenance period.

- D. Plants shall be subject to inspection and approval or rejection by the Owner at place of growth and upon delivery to the Site at any time before or during progress of the WORK based on:
 - 1. Quantity, quality, size, and variety;
 - 2. Ball and root condition; and
 - 3. Latent defects and injuries resulting from handling, disease, and insects.

- E. Plants approved at pre-planting inspection are subject to rejection during planting if found to be defective.

- F. Rejected plants shall be identified as such in an obvious manner, shall be removed from the Site, and be replaced with acceptable plants.

- G. Plants shall have been grown in nurseries that have been inspected by the governing authorities. Inspection of plant materials required by City, County, State, or Federal authorities shall be the responsibility of the CONTRACTOR, who shall have secured permits or certificates prior to delivery of plants to Site.

1.6 CLEANUP

- A. Upon completion of all planting operations, the portion of the Site used for a work or storage area by the CONTRACTOR shall be cleaned of all debris, superfluous materials, and equipment. All such materials and equipment shall be entirely removed from the Site in accordance with Section 017700 - Project Closeout.

- B. All walks or pavement shall be swept or washed clean upon completion of the WORK of this Section.

- C. During the entire Contract period, plant containers that have been cut or removed from plant materials shall be removed from the Site daily.

1.7 MAINTENANCE OF LANDSCAPING PLANTING PRIOR TO ACCEPTANCE OF PROJECT

- A. General: The CONTRACTOR shall be responsible for protecting, watering, and maintaining all planting and irrigation systems until final acceptance of all WORK under the Contract.

- B. Watering: Shrubs shall be thoroughly soaked after planting and provided with additional water at intervals as necessary to provide for good health and growth of the planting. Watering shall be accomplished by watering trucks or other portable watering on the following schedule:

Period	Watering Frequency
Week 1 - 2	Daily
Week 3 -4	Every Other Day
Week 5 - 7	Twice Weekly

Week 8 - On	As Needed
-------------	-----------

- C. The CONTRACTOR shall replace any materials or equipment or which its employees or Subcontractors have damaged.
- D. Partial utilization of the project shall not relieve the CONTRACTOR of any of the requirements contained in the Contract Documents.
- E. Plants shall be maintained in a vigorous, thriving condition by watering, cultivating, weeding, pruning, spraying, and other operations necessary. No shrubs will be accepted unless they are healthy and show satisfactory foliage conditions.
- F. All planted areas shall be cultivated at least every 2 weeks and be raked smooth to present a neat appearance, and additional mulch shall be added where necessary.
- G. Maintenance shall include, in addition to the foregoing, cleaning, edging, repairs to stakes, wire, and wrappings, the repair of erosion, and all other necessary work of maintenance. Sidewalks and other paved areas shall be kept clean while planting and maintenance are in progress.
- H. Any existing sprinkler lines broken or disrupted shall be replaced to proper working order prior to work under this Contract and shall be acceptable to the OWNER.

1.8 FINAL INSPECTION AND GUARANTEE

- A. Inspection planting will be part of final inspection under the Contract.
- B. Written notice requesting inspection shall be submitted to the Owner at least 10 days prior to the anticipated inspection date.
- C. Final acceptance prior to start of the guarantee period of the Contract will be on written approval by the Owner, on the satisfactory completion of all WORK, including maintenance, but exclusive of the replacement of plant material.
- D. Any delay in the completion of any item of work in the planting operation which extends the planting into more than one season shall extend the correction period in accordance with the date of completion given above.
- E. The CONTRACTOR shall replace, as soon as weather conditions permit, all dead plants and all plants not in a vigorous, thriving condition which are noted at the end of the one-year correction period.
- F. Plants used for replacement shall be of the same size and variety on the Plant List. Replacement plants shall be furnished, planted, staked, and mulched as indicated for new plants.
- G. All WORK under this Section shall be left in good order to the satisfaction of the OWNER, and the CONTRACTOR shall, without additional expense to the OWNER, replace any trees, shrubs, etc., which develop defects or die during the one- year correction period.

PART 2 -- PRODUCTS

2.1 GENERAL

- A. All landscaping materials for soil conditioning, weed abatement, or planting shall be first- grade, commercial quality and shall have certificates indicating the source of material, analysis, quantity, or weight attached to each sack or container or furnished with each delivery. Delivery certificates shall be given to the Owner as each shipment of material is delivered. A list of the materials used, together with typical certificates of each material, shall be submitted to the Owner prior to final acceptance.

2.2 TOPSOIL

- A. Topsoil shall be obtained from naturally drained areas and shall be fertile, friable loam suitable for plant growth. Topsoil shall be subject to inspection and approval at the source of supply and upon delivery.
- B. The topsoil shall be of uniform quality, free from subsoil, hard clods, hardpan, rocks, disintegrated debris, plants, roots, seeds, and any other materials that would be toxic or harmful to plant growth. Topsoil shall contain no noxious weeds or noxious weed seeds.
- C. The topsoil shall contain at least 6 percent organic matter as determined by loss of weight after ignition of moisture-free samples in accordance with current methods of the Association of Official Agricultural Chemists.
- D. The acidity of the topsoil shall result in soil pH between 5.5 and 7.5. The salinity level shall be less than 3 millimhos/cm.
- E. Mechanical analysis shall be performed and shall conform to ASTM D 422.

2.3 FERTILIZER AND ADDITIVES

- A. Fertilizer shall be furnished in bags or other standard containers with name, weight, and guaranteed analysis of contents clearly marked thereon.
- B. Chemical fertilizers shall be a free-flowing factory-mixed commercial fertilizer with percentages of nitrogen, phosphoric acid, and potash at 6-10-4. Fertilizers shall be uniform in composition, dry, and free flowing.
- C. Animal fertilizer shall be well-rotted cattle manure, free from sawdust, shaving, or refuse of any kind, and shall contain not more than 25 percent straw by volume.
- D. Tablets shall be 12 grams each 20-10-5 Agriform, Lesslie, or equal.
- E. Lime shall be dolomite limestone containing not less than 85 percent of total carbonates. Limestone shall be ground to such fineness that 100 percent will pass a No. 200 sieve.
- F. Agricultural gypsum shall be standard brand agricultural calcium sulfate intended for soil application and shall contain 19 percent combined sulfur.

2.4 MULCH

- A. Mulching material shall be 3-inch cypress or pine bark mulch, free of sticks, stones, or other foreign materials.

2.5 PLANT MATERIALS

- A. Plants shall meet requirements of the Contract Documents and shall be in accordance with the botanical names and applicable standards of quality, size, condition, and type. Plants shall be true to name, genera, species, and variety in accordance with reference publications.
- B. Plant names are defined in "Standardized Plant Names" and "Bailey's Encyclopedia of Horticulture." When a name is not found in either reference, the accepted name used in the nursery trade shall apply.
- C. Plants shall be marked for identification. Each bundle of plants and at least 25 percent of each species and variety of separate plants in any one shipment shall have legible labels securely attached before delivery to the Site.
- D. Shrubs shall be measured while their branches are in their normal position. Height and spread dimensions refer to the main body of the plant and not from branch or root tip to tip. No trees will be accepted with leaders cut or so damaged that cutting is necessary.
- E. All plants shall be symmetrical and shall conform to the size, age, and condition on the Plant List. Exceptions are as follows:
 - 1. Plants larger than indicated on the plant list may be used if approved by the Owner, but approval of such plants shall not increase the Contract Price. If the use of larger plants is approved, the spread of roots or ball earth shall be increased in proportion to the size of the plant. Bare root plants furnished in size greater than indicated shall be balled and burlapped when required by the Owner.
 - 2. Where caliper or other dimensions of any plant materials are omitted from the Plant List, it shall be understood that such plant materials shall be normal stock for type listed.
- F. Plants shall be of sound health, vigorous, and free from plant disease and shall be well branched, shall have full foliage when in leaf, and shall have a healthy well-developed normal root system.
- G. Balled and burlapped (BB) plants shall have firm, natural balls of earth of diameter not less than that indicated and be of sufficient depth to include all the fibrous and feeding roots. No plant moved with a ball will be accepted if the ball is cracked or broken before or during plant operations, except on approval of the Owner.
- H. Roots or balls of all plants shall be adequately protected at all times from sun and drying winds.
- I. Plants indicated to be in marked cans, pots, or other containers on the Plant List shall have been grown in the containers for a minimum of 6 months and a maximum of 2 years. Roots shall fill the containers but show no evidence of being or having been root bound.
- J. Plants shall have been transplanted or root-pruned at least once in the 2 years prior to delivery, but plants shall not be pruned immediately prior to delivery except as authorized by the Owner.

PART 3 -- EXECUTION

3.1 GENERAL

- A. The landscape work shall not be performed at any time when it may be subject to damage by climatic conditions.
- B. The CONTRACTOR shall carefully scale or otherwise verify all dimensions in the Contract Documents. Dimensions and plant locations shall be coordinated with Owner and final location shall be Site-oriented by the planter and Owner. Any discrepancies or inconsistencies shall be brought to the attention of the Owner.
- C. In case of conflict between the Plant List totals and total plant count of the Contract Documents, the CONTRACTOR shall provide the higher number of plants.
- D. Delivery of materials may begin only after samples and tests have been approved by the Owner. Materials provided shall be not less quality than the approved sample.
- E. Substitutions for the indicated plant materials may be considered pursuant to the Contract Documents.
- F. The CONTRACTOR shall provide temporary fencing, barricades, covering, or other protections to preserve existing landscaping items indicated to remain and to protect the adjacent properties and other structures when they may be damaged by the landscape work.
- G. The CONTRACTOR shall remove and/or relocate landscape items such as trees, shrubs, grass, other vegetation, improvements, and obstructions as indicated.
- H. Waste materials shall be removed and disposed of off the Site, unless otherwise indicated.
- I. It shall be the responsibility of the CONTRACTOR to obtain information regarding utilities in the area of work and to prevent damage to the same. The CONTRACTOR shall protect the utilities as necessary.
- J. Burning of combustible materials on the Site shall not be permitted.
- K. The CONTRACTOR shall protect structures, sidewalks, pavements, and other facilities that are subject to damage during landscape work. Open excavations shall be provided with barricades and warning lights which conform to the requirements of governing authorities and the State's OSHA safety requirements from dusk to dawn each day and when needed for safety.
- L. Planting areas include all areas to be landscaped unless indicated otherwise.

3.2 SOIL PREPARATION

- A. The landscape work shall not begin until all other trades have repaired all areas of settlement, erosion, rutting, etc., and the soils have been re-established, recompacted, and refinished to finish grades. The ENGINEER shall be notified of all areas that prevent the landscape work from being executed.

- B. Areas requiring grading by the landscaper including adjacent transition areas shall be uniformly level or sloping between finish elevations to within 0.10-ft above or below required finish elevations.
- C. The landscape work shall not proceed until after walks, curbs, pavings, edging, and irrigation systems are in place. WORK under the Contract shall be completed to a point where the landscape areas will not be disturbed. The subgrade shall be free of waste materials of all kinds.
- D. During grading, waste materials in the planting areas such as weeds, rocks 2-inches and larger, building materials, rubble, wires, cans, glass, lumber, sticks, etc., shall be removed from the Site. Weeds shall be dug out by the roots.
- E. Fertilizers, additives, seed, peat, etc. subject to moisture damage shall be kept dry in a weatherproof storage place.
- F. After removal of waste materials, the planting area subgrade shall be scarified and pulverized to a depth of not less than 6 inches, and all surface irregularities below the cover of topsoil shall be removed.
- G. Finish grading shall consist of:
 - 1. Final contouring of the planting areas.
 - 2. Placing 4 inches of topsoil over all areas to be planted unless indicated otherwise.
 - 3. Placing all soil additives and fertilizers.
 - 4. Tilling of planting areas.
 - 5. After tilling, bringing areas to uniform grades by floating and/or hand raking.
 - 6. Making minor adjustment of finish grades as directed by the ENGINEER.
 - 7. Removing waste materials such as stones, roots, or other undesirable foreign material and raking, disking, dragging, and smoothing soil ready for planting.
- H. Any unusual subsoil condition that will require special treatment shall be reported to the O w n e r .
- I. Topsoil shall be uniformly distributed over all areas where required. Subgrade and topsoil shall be damp and free from frost.
- J. Surface drainage shall be provided as indicated by shaping the surfaces to facilitate the natural run-off of water. Low spots and pockets shall be filled with topsoil and graded to drain properly.
- K. Finish grade of all planting areas shall be 1-1/2 inches below finish grade of adjacent pavement of any kind.
- L. In all shrub planting areas, 1-1/2 inches of peat moss or soil-aid shall be raked into the top 3 inches of soil.

3.3 DELIVERY, STORAGE, AND HANDLING OF PLANT MATERIALS

- A. No plants other than the required samples shall be dug or delivered to the Site until the required inspections have been made and the plant samples are approved.
- B. Plants shall not be pruned prior to delivery except upon approval by the Owner.
- C. Plant material shall be planted on the day of delivery if possible. The CONTRACTOR shall

protect the stock in a temporary nursery at the Site where it shall be protected from sun and drying winds and shall be shaded, kept moist, and protected with damp soil, moss, or other acceptable material. Plants shall be planted within 2 days after delivery.

- D. All balled and burlapped plants which cannot be planted immediately after delivery shall be set on the ground and be well protected with soil, wet moss, or other acceptable material.
- E. Plants shall not be picked up or moved by stem or branches, but shall be lifted and handled from the sides of the containers.
- F. Plants shall be lifted and handled from the bottom of the ball or container. Plants with balls cracked or broken before or during planting operations will not be accepted and shall be immediately removed from the Site.

3.4 PLANT LOCATIONS

- A. The CONTRACTOR shall locate all tree and shrub locations and have the locations approved by the Owner before starting excavation for same. The plant locations shall be observed, and their locations shall be adjusted as directed by Owner before final approval.

3.5 PLANT PITS

- A. Plant pits, centered on location stakes, shall be excavated circular pits with vertical sides and flat or saucer shape bottom in accordance with the following sizes unless indicated otherwise:
 - 1. Shrubs shall be planted in pits or holes of soil 24 inches deep below finished grade, or as much deeper as necessary to properly set the plant at finished grade with a minimum of 4 inches of planting soil under balls of all plants. Shrubs with balls shall be planted in pits that are at least 24 inches greater in diameter than the bottom of ball.

3.6 PREPARED BACKFILL

- A. Shrub pit backfilling soil shall consist of 3 parts topsoil, and 1 part peat or soil-aid by volume. Commercial fertilizer shall be sparingly mixed with the prepared topsoil, using 5 lb/cu yd or as required by manufacturer's printed recommendations.
- B. Planting pit, bin, and trench filling and bedding soil shall consist of 4 parts by volume topsoil mixed with one part manure and 5 lb of commercial fertilizer per cubic yard.
- C. Materials shall be thoroughly rotary-mixed on the Site before placement. Mixing of materials in pits, bins, trenches or beds will not be permitted.
- D. Shrub pits shall be provided with fertilizer tablets as follows:

- 1 per one-gallon can plant
- 3 per 5-gallon can plant
- 5 per 15-gallon can plant

3.7 ROCKS OR UNDERGROUND OBSTRUCTIONS

- A. In the event that rock or underground obstructions are encountered in the excavation of plant pits, alternative locations will be selected by the Owner.

3.8 SETTING PLANT MATERIALS

- A. The soil shall not be worked when the moisture content is so great that excessive compaction will occur, nor when it is so dry that a dust will form in the air or that clods will not break readily. Water shall be applied if necessary to provide ideal moisture for filling and for planting.
- B. Plants shall be set plumb and straight in center of pits, and at such a level that after settlement that the crown of the plant will be 2 inches above the finished grade.
- C. Balled and burlapped trees shall have planting soil placed and compacted around base of ball to fill all voids. All burlap ropes or wires shall be removed from the sides and tops of balls.
- D. Ground cover plants shall be evenly spaced, staggered in rows, and set at intervals indicated, so as to produce a uniform effect. Plants shall be watered immediately after planting operations have been completed.
- E. Shrubs shall be pruned to remove damaged branches.
- F. Planting soil around roots or balls shall be thoroughly compacted and watered. After planting, the soil in the shrub beds shall be cultivated between shrubs, raked smooth, and neatly outlined. Muddy soil shall not be used for backfilling. All broken or frayed roots shall be properly cut off.
- G. Shrubs on slopes steeper than 6 to 1 shall be provided with watering dams or berms at least 6 inches high and 8 inches wider than planting pit unless indicated otherwise.
- H. Trees shall be thoroughly watered immediately after planting.
- I. Remove all tags and labels when directed by Owner.

3.9 STAKING

- A. Staking of trees shall be done immediately after planting. Plants shall stand plumb after staking. Staking shall be as indicated.
- B. No balled and burlapped specimen "tree-like" shrubs shall be staked.

3.10 PRUNING AND MULCHING

- A. Each shrub shall be pruned in accordance with standard horticultural practice to preserve the natural character of the plant in the manner fitting its use in the landscape design, as approved by the ENGINEER.
- B. All dead wood or suckers and all broken or badly bruised branches shall be removed by thinning out and shortening branches. Deciduous bare-rooted plants shall have not less than 1/3 of their respective leaf surfaces removed. All cuts shall be made just above a healthy bud. Pruning shall be done with clean, sharp tools.
- C. Plants shall be mulched after planting and cultivating have been completed. A layer of mulch materials shall be spread on finished landscaping grade within all planting areas to a depth of 2

inches. The mulch around isolated plants shall be 6 inches greater in diameter than the planting hole. All shrub and ground cover beds shall be completely covered with the mulch.

3.11 MISCELLANEOUS ITEMS

- A. After all plants and sprinkler emitters are in place, and the existing sod in, and all mulch area has been removed to a depth of 4 inches, place filter fabric over the entire area to receive mulch.
- B. Mulch shall be placed in all shrub areas where indicated, spread carefully and evenly to a minimum depth of 4 inches over planted areas.

END OF SECTION

THIS PAGE LEFT INTENTIONALLY BLANK