
IFB NO. Y19-768-RM

ISSUED: May 24, 2019

INVITATION FOR BIDS

FOR

YUCATAN PARK PLAYGROUND COVER

**PART H
TECHNICAL SPECIFICATIONS**

**PART H
Volume II**

.....

Plans for Permit
ARCHITECTURAL DESIGN COLLABORATIVE

**PROJECT
MANUAL**

FOR THE

**Yucatan Playground Cover Invest
6400 Yucatan Drive
Orlando, Florida 32807**

PREPARED FOR

**ORANGE COUNTY CAPITAL PROJECTS DIVISION
400 SOUTH STREET
ORLANDO, FLORIDA 32801**

February 21, 2019

SECTION 00 0103
STATEMENT OF COMPLIANCE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. To the best of my knowledge the Plans and Specifications comply with the applicable minimum building codes and the applicable fire-safety standards as determined by the local authority in accordance with this Section and 633 Florida Statutes.
- B. Reference Article 101.4 Applicability, Paragraph 101.4.2 Building of the FBC.

PART 2 - PRODUCTS – Not Used

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END OF SECTION 00 0103

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Orange County
Capital Projects Division
Orlando, Florida

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Not Used

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Not Used

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SECTION 01005
ADMINISTRATIVE PROVISIONS

PART I GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

- A. Work of this Contract comprises building, site work and related construction work to produce a complete and functional facility including but not limited to plumbing, mechanical, and electrical for the construction of open air pavilion.

1.2 CONTRACT METHOD

- A. Construct the work under a single lump sum contract (or as otherwise defined in bid documents).

1.3 COORDINATION

- A. Coordinate work of the various Sections of Specifications to assure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items installed later.
- B. Verify characteristics of elements of interrelated operating equipment are compatible; coordinate work of various Sections having interdependent responsibilities for installing, connecting to and placing in service, such equipment. Differences shall be brought to the Owner's attention during bid process or remain the responsibility of the Contractor.
- C. Coordinate space requirements and installation of items, such as, but not limited to, mechanical and electrical work which are indicated diagrammatically or otherwise on drawings. Follow routing shown for pipes, ducts and conduits, as closely as practicable; make runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance and for repairs.
- D. In finished areas (except as otherwise shown), conceal pipes, ducts, and wiring in the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Execute cutting and patching to integrate elements of work, uncover ill timed, defective and nonconforming work, provide openings for penetrations of existing surfaces and provide samples as specified in individual sections for testing. Seal penetrations of existing surfaces and provide samples as specified in individual sections for testing. Seal penetrations through floors, walls and ceilings, and fire safe where necessary as part of the lump sum price.

1.4 FIELD ENGINEERING SURVEYING

- A. Provide field engineering surveying services; establish grades, lines and levels, by use of engineering survey practices recognized as standard by the survey industry. Said work shall be required to be provided by a Professional Land Surveyor, registered as such in the State of Florida.

- B. Control datum for survey is that shown on Grading and Drainage Plan. Locate and protect control and reference points.

1.5 REFERENCE STANDARDS

- A. For products specified by association or trade standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. The date of the standard is that in effect when a specified date is specified.

1.6 SUBMITTALS

- A. Obtain copies of referenced standards listed in individual specification sections. Maintain copy at job site during progress of the specific work.

END OF SECTION 01005

SECTION 01010
SUMMARY OF WORK

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 PROJECT DESCRIPTION

- A. Performance of all tasks specified in the contract documents shall be the responsibility of the contractor unless specified otherwise.

1.03 BUILDING/SITE SECURITY

- A. The construction site, to the limits indicated on the site plan, shall be secured by means of a construction fence, located around the entire perimeter of the construction site. This construction fence shall be required to be secure from unwarranted entry at the end of each day.
- B. Refer to Section 01500 for specified requirements for construction fence.

1.04 CONTRACTOR USE OF PREMISES

- A. General: Limited use of the premises to construction activities in areas indicated within the limit of the premises. The Contractor may use any portion of the site for storage or work areas or any legal purpose.
 - 1. Confine operations to areas within Contract limits indicated on the Drawings. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed.
 - 2. Keep driveways and entrances serving the premises clear and available to the Owner and the Owners' employees at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.
 - 2. Burial of Waste Materials: Do not dispose of organic and hazardous material on site, either by burial or by burning.
 - 3. Comply with Owner's requirements for ingress and egress procedures, prohibitions against firearms, procedures for transportation of workers, safety and fire prevention requirements, and all applicable pollution control requirements. Refer to the following reference documents:
 - a. Orange County Safety and Health Manual
 - b. Orange County Policy Manual (pg. 100 regarding firearms)
 - 4. Require all employees and subcontractors to wear no-objectionable clothing;

prohibit revealing clothing and articles of clothing with offensive writing displayed. Remove from premises all personnel until such clothing is changed.

5. All personnel shall abide by the Orange County Tobacco Free policy while on any Orange County property. Policy applies to buildings, parking lots, parks, break areas, and work sites. Tobacco products are defined as cigars, cigarettes, pipes, e-cigs, chewing tobacco and snuff. Failure to abide by the policy may result in civil penalties levied under Chapter 386, Florida Statutes and Contract enforcement remedies.

1.05 DISTRIBUTION OF RELATED DOCUMENTS

- A. The Contractor is solely responsible for the distribution of ALL related documents/drawings to ALL appropriate vendors/subcontractors to ensure proper coordination of all aspects of the project and its related parts during bidding and construction.

1.06 CONSTRUCTION BULLETIN BOARD

- A. The Contractor shall erect and maintain a weather protected bulletin board of sufficient size to display all permits, notices and other documents required to be posted for the Project. Said bulletin board shall be located per Owner's direction.

1.07 SECURITY AND IDENTIFICATION

- A. The building (construction area) shall be secured from unwanted entry at the end of each work day.
- B. All costs for background investigations will be the Contractor's responsibility. The County shall have the right to request any additional investigative background information including, but not limited to, employment records, Right-to Know records, E-verify system records (If the contractor uses this service as a means to determine employee eligibility), training records, payroll records, position for which hired including site location of any personnel assigned to perform the services. Furnish, in writing, all such information to the extent allowed by law, prior to commencement of services. The County reserves the right to conduct its own investigation of any employee or subcontractor of the Contractor.
- C. Background Checks for the Contractor's staff must be approved by Orange County's security team prior to working in any County facility. Obtain necessary forms for background checks for work at Orange County. All Contractor's staff background checks will be sent to the Orange County project Manager for approval.
- D. For security purposes and to maintain privacy, please submit a FDLE Background Checks via email. The subject line of the email must contain the following ***EXEMPT***
- E. Orange County will inform the Contractor of their Background Check results. Upon Background Check approval, the contractor's staff shall arrange an appointment with the Orange County staff to obtain an Orange County ID Badge. An Affidavit of Identity form (Issued by Contractor) and a State of Florida ID or Driver's License will be required.

- F. Contractor's employees will not be allowed in Orange county facilities without completed and approved background investigations.

1.08 BUILDING/SITE SECURITY REQUIREMENTS

- A. Provide security for each and every day that work is being performed on Site. The security firm that will be used is:
G4S Security Systems (USA), Inc.
Contact: Jose Troche, MBA
Phone: 407 207 3221
Jose.troche@usa.g4s.com

1.09 OWNER OCCUPANCY

- A. The Owner will occupy the building and areas next to the Work area. Normal hours are 7:00 AM to 5:00 PM Monday thru Friday. Coordinate with the Owner's representative for Work areas that can be performed on during normal work hours. Work can be performed after hours provided the area where Work is done is fully operational and back in original condition prior to beginning the next business day. Such placing of equipment and partial occupancy shall not constitute acceptance of the total Work.
1. A certificate of Substantial Completion will be executed for each specific portion of the Work to be occupied prior to Owner occupancy
 2. Obtain a Certificate of Occupancy from the local building officials prior to Owner occupancy.
 3. Prior to partial occupancy, mechanical and electrical systems shall be fully operational. Required inspections and tests shall have been successfully completed. Upon occupancy, the Owner will provide operation and maintenance of mechanical and electrical systems in occupied portions of the building.

PART 2 PRODUCTS

2.01 ASBESTOS FREE MATERIAL

- A. Contractor shall provide a written and notarized statement on company letterhead(s) to certify and warrant that ONLY ASBESTOS FREE MATERIALS AND PRODUCTS were provided as required by the Architect in Section 01400, QUALITY CONTROL. Such statement shall be submitted with the final payment request. Final payment shall not be made until such statement is submitted. Contractor agrees that if materials containing asbestos are subsequently discovered at any future time to have been included in the construction, the Contractor shall be liable for all costs related to the redesign or modification of the construction of the project so that materials containing asbestos are removed from the facility. If construction has begun or has been completed pursuant to a design that includes asbestos containing materials, the Contractor shall also be liable for all costs related to the abatement of such asbestos.

Orange County
Capital Projects Division
Orlando, Florida

Yucatan Playground Cover Invest
6400 Yucatan Drive
Orlando, Florida

PART 3 EXECUTION (Not applicable).

END OF SECTION 01010

SECTION 01027
APPLICATION FOR PAYMENT

PART I GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements governing the Contractor's Applications for Payment.
- B. The Contractor's Construction Schedule and Submittal Schedule are included in Section 01300 – SUBMITTALS.

1.03 SCHEDULE OF VALUES

- A. Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
 - 1. Submit the Schedule of Values to the Owner at the earliest feasible date, but in no case later than Preconstruction Meeting. Refer to Section 01200.
 - 2. Sub-Schedules: Where the Work is separated into phases that require separately phased payments, provide sub-schedules showing values correlated with each phase of payment.
- B. Format and Content: Use the Project Manual Table of Contents as a guide to establish the format for the Schedule of Values.
 - 1. Identification: Include the following project identification on the Schedule of Values:
 - a. Project name and location.
 - b. Name of the Architect
 - c. Project Number
 - d. Contractor's name and address
 - e. Date of submittal
 - 2. Arrange the Schedule of Values in a tabular form with separate columns to indicate the following for each item listed:
 - a. Generic name
 - b. Related Specification Section
 - c. Change Orders (numbers) that have affected value
 - d. Dollar Value
 - e. Percentage of Contract Sum to the nearest one-hundredth percent,

adjusted to total 100 percent

3. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Break principal subcontract amounts down into several line items:
 - a. A value will be given for at least every major specification section (subsections can logically be grouped together).
 - b. A single material subcontractor (i.e. sod, window blinds) will not be required to be broken down into labor and material unless it is anticipated the materials will be stored and invoiced prior to installation.
 - c. All multiple item subcontracts or work items (i.e. concrete, roofing, painting, mechanical, electrical items, etc.) will be shown broken down at least in labor and material (all taxes, burden and overhead and profit included).
 - d. Mobilization (move-on, bond, insurance, temporary office and sanitary service installation) shall not exceed 2 1/2% of contract price.
 - e. For multi-story work all items broken down per floor.
 - f. Concrete broken down at least into foundation slab on grade, columns, beams and suspended slabs.
 - g. Masonry divided into C.M.U. brick, stem walls, exterior walls, interior walls and elevator shaft.
 - h. Plumbing broken down at least into underslab rough-in, vents and stacks supply piping, equipment items (each listed separately), fixtures and trim.
 - i. HVAC: Typically shown per specification section, labor and material, per floor.
 - j. Electrical: same as HVAC.
 - k. Fire protection broken down at least into underground, rough-in and trim. All per building and labor and material.
 - l. Logical grouping of specification subsections is permitted.
4. Round amounts off the nearest whole dollar, the total shall equal the Contract Sum.
5. For each part of the Work where an Application for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed, provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
6. Margins of Cost: Show line items for indirect costs, and margins on actual costs, only to the extent that such items will be listed individually in Applications for Payment. Each item in the Schedule of Values and Applications for Payment shall be complete including its total cost and proportionate share of general overhead and profit margin.
 - a. At the Contractors' option, temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown as separate line items in the Schedule of Values or distributed as

general overhead expense.

7. Schedule Updating: Update and resubmit the Schedule of Values when Change Orders or Construction Change Directives result in a change in the contract sum.

1.04 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as reviewed by the Owner representative and paid for by the Owner.
 1. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the Final Application for Payment involve additional requirements.
- B. Payment Application Times: The period of construction work covered by each Application of Payment is the period indicated in the Agreement.
- C. Payment Application Forms: Use the County's most updated form as the form for Application for Payment. Form given at the Preconstruction Conference.
- D. Application Preparation: Complete every entry on the form, including notarization and execution by person authorized to sign legal documents on behalf of the Owner. Incomplete applications will be returned without action.
 1. Entries shall match data on the Schedule of Values and Contractors' Construction Schedule. Use updated schedules if revisions have been made.
 2. Include amounts of Change Orders and Construction Change Directives issued prior to the last day of the construction period covered by the application.
- E. Transmittal: Submit five (5) original executed copies of each Application for Payment to the Project Manager by means ensuring receipt within 24 hours; one copy shall be complete, including waivers of lien and similar attachments, when required.
 1. Transmit each copy with a transmittal form listing attachments, and recording appropriate information related to the application in a manner acceptable to the Project Manager.
- F. Payment will be processed once a month. Payment for item will be based on percentage completed as determined and approved by the County Project Manager or invoice for stored materials. Retainage (10%) will be held for all applications.
- G. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment; this application shall reflect any Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work. Application

shall also include all items listed in Part H. above.

H. Final Payment Application: Administrative actions and submittals, which must precede or coincide with submittal of the final payment. Application for Payment includes the following:

1. Completion of Project Close-Out requirements
2. Completion of items specified for completion after Substantial Completion (Punch List)
3. Contractor's release of lien (on Owner's form)
4. Subcontractor and material supplier release of lien (If applicable)
5. Consent of Surety
6. Power of attorney
7. Asbestos-free letter, notarized

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

END OF SECTION 01027

SECTION 01035
MODIFICATION PROCEDURES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This section specifies administrative and procedural requirements for handling and processing Contract modifications.

1.03 MINOR CHANGES IN THE WORK

- A. Supplemental instructions authorizing minor changes in the work, not involving an adjustment to the Contract Sum or Contract Time, will be issued by the Project Manager.

1.04 CHANGE ORDER PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Proposed changes in the work that will require adjustment to the Contract Sum or Contract Time will be issued by the Project Manager, with a detailed description of the proposed change and supplemental or revised Drawings and Specifications, if necessary.
 - 1. Proposal requests issued by the Project Manager are for information only. Do not consider them instruction either to stop work in progress, or to execute the proposed change.
 - 2. Unless otherwise indicated in the proposal request, within 7 days of receipt of the proposal request, submit to the Project Manager from the Owner's review, an estimate of cost necessary to execute the proposed change.
 - a. Include a list of quantities of products to be purchased and unit costs, along with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include a statement indicating the effect the proposed change in the work will have on the Contract Time.
 - d. Contractor and subcontractors will provide a complete detailed labor and material breakdown to justify change order request amount.
- B. Contractor-Initiated Change Order Proposal Requests: When latent or other unforeseen conditions in mutual accord with the Owner Representative's findings require modifications to the Contract, the Contractor may propose changes by submitting a request for a change to the Architect.

1. Include a statement outlining the 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 Contract Time.
2. Include a list of quantities of products to be purchased and unit costs along with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Comply with requirements in Section 01631 – Product Substitutions- if the proposed change in the work requires that substitution of one product or system for a product or system not specified.
5. Contractor and subcontractors will provide a complete detailed labor and material breakdown to justify change order request amounts.

1.05 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: When the Owner and Contractor are not in total agreement on the terms of a Change Order Proposal Request, the Project Manager may issue a Construction Change Directive instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 1. The Construction Change Directive will contain a complete description of the change in the Work and designate the method to be followed to determine change in the Contract Sum or Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 1. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

1.07 CHANGE ORDER PROCEDURES

- A. Upon the Owner's approval of a Change Order Proposal Request, the Project Manager will issue a Change Order for signatures of the Owner and Contractor on County's Change Order form, as provided in the Conditions of the Contract.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

END OF SECTION 01035

SECTION 01040
PROJECT COORDINATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section specifies administrative and supervisory requirements necessary for project coordination including, but not necessarily limited to:
1. Coordination
 2. Administrative and supervisory personnel
 3. General installation provisions
 4. Cleaning and protection
- B. Progress meetings, coordination meetings And Pre-installation conferences are included in Section 01200 'Project Meetings'.
- C. Requirements for the Contractor's Construction Schedule are included in Section 01300 'Submittals'.

1.03 COORDINATION

- A. Coordination: Coordinate construction activities included under various Sections of these Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections of the Specification that are dependent upon each other for proper installation, connection, and operation.
1. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.
 2. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required: notices, reports, and attendance at meetings.
1. Prepare similar memoranda for the Owner and separate Contractors where

coordination of their Work is required.

- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Schedules
 - 2. Installation and removal of temporary facilities
 - 3. Delivery and processing of submittals
 - 4. Progress meetings
 - 5. Project close-out activities
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
 - 1. Salvage materials and equipment (if any) involved in performance of, but not actually incorporated in, the Work.
- E. Lack of coordination as specified in this and other sections of the contract documents are in grounds for assessment of back charges and/or termination in order to remediate the situation.

1.04 SUBMITTALS

- A. Coordination Drawings: Prepare and submit coordination Drawings where close and careful coordination is required for installation of products and materials fabricated off-site by separate entities, and where limited space availability necessitates maximum utilization of space for efficient installation of different components.
 - 1. Show the interrelationship of components shown on separate Shop Drawings.
 - 2. Indicate required installation sequences.
 - 3. Comply with requirements contained in Section Submittals.
 - 4. Refer to Facility Services documents for specific coordination Drawing requirements for mechanical and electrical installations.
- B. Staff Names: At the Preconstruction Conference submit a list of the Contractor's principal staff assignments, including the Superintendent and other personnel in attendance at the site; identify individuals, their duties and responsibilities; list their addresses and telephone numbers.
 - 1. Post copies of the list in the project meeting room, the temporary field office, and each temporary telephone.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.01 GENERAL INSTALLATION PROVISIONS

- A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.
- C. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.
- D. Provide attachment and connection devices and methods necessary for securing work. Secure work true to line and level. Allow for expansion and building movement.
- E. Visual Effects: Provide uniform joint widths in exposed work. Arrange joints in exposed work to obtain the best visual effect. Refer questionable choices to Project Manager for final decision.
- F. Recheck measurements and dimensions, before starting each installation.
- G. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.
- H. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.
- I. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Architect/Project Manager for final decision.

3.02 CLEANING AND PROTECTION

- A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- B. Clean and maintain completed construction as directed by the Project Manager and as frequently as necessary to ensure its integrity and safety through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

- C. Limiting Exposures: Supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where the applicable, such exposures include, but are not limited to, the following:
1. Excessive static or dynamic loading
 2. Excessively high or low temperatures
 3. Excessively high or low humidity
 4. Air contamination or pollution
 5. Water
 6. Solvents
 7. Chemicals
 8. Soiling, staining and corrosion
 9. Rodent and insect infestation
 10. Combustion
 11. Destructive testing
 12. Misalignment
 13. Excessive weathering
 14. Unprotected storage
 15. Improper shipping or handling
 16. Theft
 17. Vandalism

END OF SECTION 01040

SECTION 01095
REFERENCE STANDARDS AND DEFINITIONS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. Indicated: The term *indicated* refers to graphic representations, notes or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Where terms such as shown, noted, scheduled and specified are used, it is to help the reader locate the reference; no limitation on location is intended.
- C. Directed: Terms such as directed, requested, authorized, selected, accepted, required, and permitted mean directed by the Project Manager, requested by the Architect/Project Manager and similar phrases.
- D. Approved: This term approved means accepted, where used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.
- E. Regulations: The term Regulations includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. Furnish: The term furnish is used to mean supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. Install: The term install is used to describe operations at project site including the actual unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. Provide: The term provide means to furnish and install, complete and ready for the intended use.
- I. Installer: An Installer is the Contractor or an entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier for performance of a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.

- 1. The term experienced, when used with the term Installer, means having a

minimum of five previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of the authority having jurisdiction.

2. Trades: Use of titles such as carpentry is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as carpenter. It also does not imply that requirements specified apply exclusively to trades persons of the corresponding generic name.
- J. Project Site is the space available to the Contractor for performance of construction activities, either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.
- K. Testing Laboratories: A testing laboratory is an independent entity engaged to perform specific inspections or tests, either at the Project sites or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.
- L. Florida Building Code (FBC): Where the term or acronym is used it will mean the current edition of the Florida Building Code with all applicable revisions adopted by the authorities having jurisdictions at the location of the Project.

1.03 SPECIFICATION FORMAT AND CONTENT EXPLANATION

- A. Specification Format: These Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's MASTER FORMAT numbering system.
 1. Division 01 is based on Master Format 1995
 2. All others are based on Master Format 2014
- B. Specification Content: This Specification uses certain conventions in the use of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:
 1. Abbreviated Language: Language used in Specifications and other Contract Documents is the abbreviated type. Words and meaning shall be interpreted as appropriate. Words that are implied, but not stated shall be interpolated as the sense required. Singular words will be interpreted as plural and plural words interpreted as singular where applicable and the context of the Contract Documents so indicates.
 2. Imperative and streamlined language is used generally in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the text, for clarity, subjective language is used to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.

- a. The words, shall be shall be included by inference wherever a colon (:) is used within a sentence or phrase.

1.04 INDUSTRY STANDARDS

- A. **Applicability of Standards:** Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copies directly into the Contract Documents to the extend reference. Such standards are made part of the Contract Documents by reference.
- B. **Publication Dates:** Comply with the standard in effect as of the date of the Contract Documents.
- C. **Conflicting Requirements:** Where compliances with two or more standards are specified, and the standards may establish different or conflicting requirements for minimum quantities or quality levels. Refer requirements that are different, but apparently equal, and uncertainties to the Architect for a decision before proceeding.
 1. **Minimum Quantity or Quality Levels:** The quantity of quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. In complying with these requirements, indicated numeric values are minimum or maximum, as appropriate for the context of the requirements. Refer uncertainties to the Architect/Owner for a decision before proceeding.
- D. **Copies of Standards:** Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with the Contract Documents.
 1. Where copies of standards are needed for performance of a required construction activity. The Contractor shall obtain copies directly from the publication source or any other authorized source.
- E. **Abbreviations and Names:** Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards generating organization, authority having jurisdiction, or other entity applicable to the context of the text provision. See Trade Reference List at the end of this Section refer to the Encyclopedia of Associations, published by Gale Research Co., available in most libraries.

1.05 SUBMITTALS

- A. **Permits, Licenses, and Certificates:** For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence, and records established in conjunction with compliance with

standards and regulation bearing upon performance of the Work.

PART 2 PRODUCTS

(Not Applicable)

PART 3 EXECUTION

(Not Applicable)

END OF SECTION 01095

SECTION 01200
PROJECT MEETINGS

PART 1 GENERAL

1.01 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.

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements for project meetings including but not limited to:
1. Pre-Construction Conference
 2. Pre-Installation Conference
 3. Coordination Meetings
 4. Progress Meetings
- B. Construction schedules are specified in Section 01300 Submittals.

1.03 PRE-CONSTRUCTION CONFERENCE

- A. Schedule a pre-construction conference and organizational meeting at the project site or other convenient location no later than 20 days after execution of the agreement and prior to commencement of construction activities. Conduct the meeting to review responsibilities and personnel assignments.
- B. Attendees: The OWNER'S Representative, Architect, the Contractor and its superintendent, major subcontractors, manufacturers, suppliers and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the work.
- C. Agenda: Discuss items of significance that could affect progress including such topics as:
1. Tentative construction schedule
 2. Critical Work sequencing and/coordinating
 3. Designation of responsible personnel
 4. Procedures for processing field decisions and Change Orders
 5. Procedures for processing Applications for Payment
 6. Distribution of Contract Documents
 7. Submittal of Shop Drawings, Product Data and Samples
 8. Preparation of record documents
 9. Use of the Premises
 10. Office, Work and storage areas
 11. Equipment deliveries and priorities
 12. Safety procedures

13. First aid
14. Security
15. Housekeeping
16. Working hours

D. Contractor must submit at the time of the meeting at least the following items:

1. Schedule of Values
2. Listing of key personnel including project superintendent and subcontractors with their addresses, telephone numbers, and emergency telephone numbers.
3. Preliminary Construction Schedule
4. Submittal Schedule

1.04 PRE-INSTALLATION CONFERENCE

A. Conduct a Pre-installation conference at the site before each construction activity that requires coordination with other construction. The 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 at least 48 hours in advance the Project Manager of scheduled meeting dates.

1. Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation conference, including requirements for:
 - a. Contract Documents
 - b. Options
 - c. Related Change Orders
 - d. Purchases
 - e. Deliveries
 - f. Shop Drawings, Product Data and Quality Control Samples
 - g. Possible conflicts
 - h. Compatibility problems
 - i. Time schedules
 - j. Weather limitations
 - k. Manufacturer's recommendations
 - l. Comparability of materials
 - m. Acceptability of substrates
 - n. Temporary facilities
 - o. Space and access limitations
 - p. Governing regulations
 - q. Safety
 - r. Inspection and testing requirements
 - s. Required performance results
 - t. Recording requirements
 - u. Protection
2. Record significant discussions, agreements, and disagreements of each

conference along with an approved schedule. Distribute the record of the meeting to everyone concerned promptly including the Owner and Architect.

3. Do not proceed if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.

1.05 COORDINATION MEETINGS

- A. Conduct project coordination meeting at weekly intervals on day and time as established by the Project Manager or more frequently, if necessary convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special pre-installation meetings.
- B. Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved, to include subcontractors and representatives.
- C. Contractor shall record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.06 PROGRESS MEETINGS

- A. Conduct progress meetings at the Project site at bimonthly intervals or more frequently if necessary as directed by the Project Manager. Notify the Owner at least 48 hours in advance of scheduled meeting time and dates. Coordinate dates of meetings with preparation of the payment request.
- B. Attendees: In addition to representatives of the Owner and Architect, each subcontractor, supplier or other entity concerned with current progress of involved in planning, coordination or performance of future activities with the project and authorized to conclude matters relating to progress.
- C. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the Project.
 1. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time, ahead, or behind 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.
 2. Review the present and future needs of each entity present, including such items as:

- a. Interface requirements
- b. Time
- c. Sequences
- d. Deliveries
- e. Off-site fabrication problems
- f. Access
- g. Site utilization
- h. Temporary facilities and services
- i. Hours of work
- j. Hazards and risks
- k. Housekeeping
- l. Quality and work standards
- m. Change Orders
- n. Documentation of information for payment requests.

- D. Reporting: No later than 3 days after each progress meeting date, distribute copies of minutes of the meeting to each party present and to other parties who should have been present. Include a brief summary, in narrative form, or progress since the previous meeting and report.

PART 2 PRODUCTS

(Not Applicable)

PART 3 EXECUTION

(Not Applicable)

END OF SECTION 01200

SECTION 01 2301
ADDITIVE OR DEDUCTIVE BID ITEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements governing additive and deductive bid items.

1.2 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent work as necessary to integrate work of additive or deductive bid item into the Project.
- B. Include as part of each additive or deductive bid item, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not mentioned as part of the alternate.
- C. Execute accepted additive or deductive bid items under the same conditions as other Work.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 GENERAL

- A. Amount listed for each additive or deductive bid item shall include related coordination, modifications, and adjustments to adjoining and related work, including administrative activities.

3.2 SCHEDULE OF ADDITIVE BID ITEMS

- A. Additive bid item No. 01
 - 1. Base Bid No New Fencing: 0.00 dollars as no work would be involved
 - 2. New Fencing: State the amount to be added to the Base Bid for providing all work including labor, materials, coordination and supervision to provide new fencing per Section 323100.

END OF SECTION 01 2301

SECTION 01300
SUBMITTALS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements for submittals required for performance of the Work, including:

1. Contractor's Construction Schedule
2. Submittal Schedule
3. Daily Construction Reports
4. Shop Drawings
5. Product Data
6. Samples

- B. Administrative Submittals: Refer to other Division-1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to:

1. Permits
2. Applications for Payment
3. Performance and Payment Bonds
4. Insurance Certificates
5. List of Subcontractors with start and finish dates (update as necessary)
6. Schedule of Values
7. Construction Schedule

- C. The Schedule of Values submittal is included in Section 01027 Applications for Payment.

- D. Inspection and test reports are included in Section 01400 Quality Control Services.

1.03 SUBMITTAL PROCEDURES

- A. Review, stamp and approve each submittal prior to transmitting to Architect. Without such stamp and signature, submittal will be returned NOT REVIEWED.

- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.

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 elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
 - a. The Project Manager reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
3. Processing: Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for resubmittals.
 - a. Allow two weeks for initial review. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. The Project Manager will promptly advise the Contractor when a submittal being processed must be delayed for coordination.
 - b. If an intermediate submittal is necessary, process the same as the initial submittal.
 - c. Allow two weeks for reprocessing each submittal.
 - d. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.

B. Electronic Submittal Administrative Requirements

1. Identify and incorporate information in each electronic submittal file as follows:
 - a. Assemble complete submittal package into a single indexed and bookmarked file with links enabling navigation to each item.
 - b. Scanned using 300 dpi resolution
 - c. Name file with submittal number identifier described in Part 1 Article – Submittal Procedures
 - d. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by all reviewers.
 - e. Samples will require a physical delivery with transmittal. Sample approval may be electronic, depending on submittal requirements of that section.
2. Post electronic submittals as PDF electronic files directly to designated FTP site specifically established for Project. Notify Architect via email when shop drawing files have been posted.
 - a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
 - b. Provide electronic submittals for:
 - 1) Product Data
 - 2) Shop Drawings
 - 3) Project Schedule
 - 4) Sustainable Construction Program Submittals
 - 5) Delegated Design Services

- c. Required Number of Submittals:
 - 1) Submit one CD with Shop Drawings
 - 2) Scan all pages of submittal to .pdf format and submit on a CD
 - 3) Distribution: 1 CD will returned for printing and distribution
- 3. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 - a. Provide a digital signature with digital certificate on electronically-submitted certificates
- D. Contractor shall be responsible for cost of re-review of rejected submittals. Costs for re-review shall be reimbursed to the County by deducting the cost from the Contractors monthly progress payments. Costs to be determined by applying the consultant's standard billing rates, plus 10% handling by the County.
- E. Substitution request to specified products will be made within 30 days of Notice to Proceed. After the 30 day period, no requests for substitutions from the Contractor will be considered.
 - 1. Substitution submitted within the first 30 days will have product data from specified and requested substitute submitted together and demonstrate better quality, cost savings if of equal quality, or show benefit to the County for excepting the substitute.
- F. Once submittals are approved or approved as noted, they will be scanned and converted to PDF documents with OCR (optical character recognition) and given to the owner.

1.04 CONTRACTOR'S CONSTRUCTION SCHEDULE (LINEAR BAR CHART SCHEDULE)

- A. Linear bar chart time control schedule
 - 1. Work overtime, nights, and weekends, as necessary to maintain schedule.
 - 2. Overtime, night, and weekend work will be at no additional cost to the Owner.
 - 3. Expedite approvals and deliveries of material so as not to delay job progress.
- B. Contract Modifications: For each proposed contract modification and concurrent with its submission, demonstrate the effect of the proposed change on the project schedule.
- C. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
 - 1. Identification of activities that have changed.
 - 2. Changes in start dates.
 - 3. Changes in finish dates.
 - 4. Changes in the Contract Time.

1.05 SUBMITTAL LOG

- A. After development and acceptance of the Contractor's construction schedule, prepare a complete log of submittals.
1. Coordinate submittals log with the list of subcontracts, schedule of values and the list of products as well as the Contractor's construction schedule.
 2. Prepare the log in chronological order; include all submittals required. Provide the following information:
 - a. Scheduled date for the first submittal
 - b. Related Section number
 - c. Submittal category
 - d. Name of subcontractor
 - e. Description of the part of the work covered
 - f. Scheduled date for resubmittal
 - g. Scheduled date the Architect's final release or approval.
 3. All submittals must be received within the first 25% of contract time.
- B. Distribution: Following response to initial submittal, print and distribute copies to the Project Manager, subcontractors, and other parties required to comply with submittal dates indicated. Post copies in the project meeting room and field office.
1. When revision are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.
- C. Log Updating: Revise the log after each meeting or activity, where revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting.

1.06 DAILY CONSTRUCTION REPORTS

- A. Prepare a daily construction report, recording the following information concerning events at the site; and submit duplicate copies to the Project Manager at weekly intervals:
1. List of subcontractors at the site
 2. Approximate count of personnel at the site
 3. High and low temperatures, general weather conditions
 4. Accidents and unusual events
 5. Meetings and significant decisions
 6. Stoppages, delays, shortages, losses
 7. Meter readings and similar recordings
 8. Emergency procedures
 9. Orders and requests of governing authorities
 10. Change Orders received, implemented

11. Services connected, disconnected
12. Equipment or system tests and start-ups
13. Partial completions, occupancies
14. Substantial Completions authorized

1.07 SHOP DRAWINGS

- A. Submit newly prepared information, drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not considered a Shop Drawings and will be rejected.
- B. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Include the following information:
 1. All required dimensions
 2. Identification of products and materials included
 3. Compliance with specified standards
 4. Notation of coordination requirements
 5. Notation of dimensions established by field measurement
 6. Sheet Size: Except for templates, patterns and similar full-size Drawings on sheets at least 8 1/2" x 11" but no larger than 24" x 36".
 7. Initial Submittal: Submit one correctable translucent reproducible print and one blue-or black-line print for the Project Manager's review; the reproducible print will be returned.
 8. Initial Submittal: Submit 2 blue-or black-line prints for the Architect's review; one will be returned.
 9. Final Submittal: Submit 5 blue-or black-line prints; submit 7 prints where required for maintenance manuals. 3 prints will be retained; the remainder will be returned.
 10. Final Submittal: Submit 3 blue-or black-line prints; submit 5 prints where required for maintenance manuals. 2 prints will be retained; the remainder will be returned.
 - a. One of the prints returned shall be marked-up and maintained as a Record Documents.
 11. Do not use Shop Drawings without an appropriate final stamp indicating action taken in connections with construction.
- C. Coordination drawings are a special type of Shop Drawing that show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or function as intended.
 1. Preparation of coordination Drawings is specified in section Project Coordination and may include components previously shown in detail on Shop Drawings or Product Data.
 2. Contractor is not entitled to additional payments due to lack of compliance with this Section.

1.08 PRODUCT DATA

- A. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams and performance curves. Where Product Data must be specially prepared because standard printed data is not suitable for use, submit as a Shop Drawing.
1. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products, some of which are not required, mark copies to indicate the applicable information. Include the following information:
 - a. Manufacturer's printed recommendations
 - b. Compliance with recognized trade association standards
 - c. Compliance with recognized testing agency standards
 - d. Application of testing agency labels and seals
 - e. Notation of dimensions verified by field measurement
 - f. Notation of coordination requirements
 - g. Manufacturers local representative and phone number.
 2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
 3. Preliminary Submittal: Submit a preliminary single-copy of Product Data where selection of options is required.
 4. Submittals: Submit six (6) copies of each required submittal. The Project Manager will return two (2) sets to the Contractor marked with action taken and corrections or modifications required.
 - a. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
 5. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.
 - a. Do not proceed with installation until an applicable copy of Product Data applicable is in the Installer's possession.
 - b. Do not permit use of unmarked copies of Product Data in connection with construction.

1.09 SAMPLES

- A. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of materials, color range sets, and swatches showing color, texture and pattern.

1. Mount, display, or package Samples in the manner specified to facilitate review of qualities indicated. Prepare Samples to match the Architect's/Owner's Sample. Include the following:
 - a. Generic description of the Sample
 - b. Sample source
 - c. Product name or name of manufacturer
 - d. Compliance with recognized standards
 - e. Availability and delivery time
 2. 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 the final submittal and the actual component as delivered and installed.
 - a. Where variation in color, pattern, texture or other characteristics are inherent in the material or product represented, submit multiple units (not less than 3), that show approximate limits of the variations.
 - b. Refer to other Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation and similar construction characteristics.
 3. Preliminary submittals: Where Samples are for selection of color, pattern, texture or similar characteristics from a range of standard choices, submit a full set of choices for the material or product.
 - a. Preliminary submittals will be reviewed and returned with the Architect's/Owner's mark indicating selection and other action.
 4. Submittals: Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation and similar characteristics, submit 3 sets; one will be returned marked with the action taken.
 5. Maintain sets of Samples, as returned, at the project site, for quality comparisons throughout the course of construction.
 - a. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
 - b. Sample sets may be used to obtain final acceptance of the construction associated with each set.
- B. Distribution of Samples: Prepare and distribute additional sets to subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the Work. Show distribution on transmittal forms.
1. Field Samples specified in individual sections are special types of Samples. Field Samples are full-size examples erected on site to illustrate finishes, coatings, or finish materials and to establish the standard by which the work

will be judged.

- a. Comply with submittal requirements. Process transmittal forms to provide a record of activity.

1.10 ARCHITECT'S ACTION

A. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Architect/Project Manager will review each submittal, mark to indicate action taken, and return promptly.

1. Compliance with specified characteristics is the Contractor's responsibility.

B. Action Stamp: The Architect will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, similarly as follows, to indicate the action taken:

1. Final Unrestricted Release: Work may proceed, provided it complies with contract documents, when submittal is returned with the following: "No Exceptions Taken"
2. Final-But Restricted Release: Work may proceed, provided it complies with notations and corrections on submittal and with contract documents, when submittal is returned with the following: "Note Comments"
3. Returned for Resubmittal: Do not proceed with work. Revise submittal in accordance with notations thereon, and resubmit without delay to obtain a different action marking. Do not allow submittals with the following marking (or unmarked submittals where a marking is required) to be used in connection with performance of the work: "Resubmit"

- a. Do not permit submittals marked 'Revise and Resubmit' to be used at the Project site, or elsewhere where work is in progress.

4. Rejected: Submittal does not comply with requirements of the Contract Documents. Submittal must be discarded and entirely new submittal shall be forward to the Project Manager without delay: "Rejected"

PART 2 PRODUCTS

(Not Applicable)

PART 3 Execution

(Not Applicable)

END OF SECTION 01300

SECTION 01 3233
PRE-CONSTRUCTION VIDEO RECORDING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes construction video recordings.

1.2 SUBMITTALS

- A. Two standard size DVD videos in Microsoft viewer format of the entire Site prior to the commencement of any work.

1.3 QUALITY ASSURANCE

- A. Video Recordings:
1. Format in latest release of Windows Media Player.
 2. Record the DVD prior to the commencement of any work.
 3. Architect shall review DVD prior to the commencement of construction activity.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 PRE-CONSTRUCTION VIDEOS

- A. Before starting Work, take videos of the site and surrounding properties from different points of view as selected by the Architect and Owner's Representative. Record pre-existing conditions of the building, site, and abutting properties obtained from several perspectives. Provide narrative describing the vantage point and area being photographed.
- B. Video in sufficient length and detail to show the following:
1. All locations at the areas where the construction limits have been established.
 2. Path to Work area from staging area/parking lot.
 3. Inside and outside of area where canopy will be installed
 4. Pathways to load centers to be modified.
 5. Designated staging areas
- C. The architect reserves the right to request additional videos for the duration of the Project.

END OF SECTION 01 3233

SECTION 01380
CONSTRUCTION PHOTOGRAPHS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. General: This Section specifies administrative and procedural requirements for construction photographs.
- B. *See Section 013233 for preconstruction video documentation*

1.03 SUBMITTALS

- A. Photographs: Submit actual RAW images

PART 2 PRODUCTS
Not Used

PART 3 EXECUTION

3.01 PHOTOGRAPHIC REQUIREMENTS

- A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
 - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
 - 1. Digital Images: Provide images in JPG format, produced by a digital camera with minimum sensor size of 8 megapixels, and at an image resolution of not less than 3200 by 2400 pixels.
 - 2. Date and Time: Include date and time in file name for each image.
- C. Preconstruction Photographs: Before starting construction and subject to Owner approval, take four color photographs of Project site from different vantage points, as directed by Owner.
- D. Periodic Construction Photographs: Subject to Owner approval, take twelve color photographs monthly, coinciding with cut-off date associated with each Application

for Payment. Select interior vantage points to best show status of construction and progress since last photographs were taken.

1. Subject to Owner approval, take photographs for each submittal from the same viewpoint unless specifically directed otherwise by Architect.
- E. Final Completion Construction Photographs: Subject to Owner approval, take twelve color photographs after date of Substantial Completion for submission as Project Record Documents. Architect will direct photographer for desired vantage points.

END OF SECTION 01380

SECTION 01400
QUALITY CONTROL SERVICES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements for quality control services.
- B. Quality control services include inspections and tests and related actions including reports, performed by independent agencies, governing authorities, and the Contractor. They do not include Contract enforcement activities performed by the Architect.
- C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve the Contractor of responsibility for compliance with Contract Document requirements.
- D. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.
 - 1. Specific quality control requirements for individual construction activities are specified in the Sections that specify those activities. Those requirements, including inspections and test, cover production of standard products as well as customized fabrication and installation procedures.
 - 2. Inspection, test and related actions specified are not intended to limit the Contractor's quality control procedures that facilitates compliance with Contract Document requirements.
 - 3. Requirements for the Contractor to provide quality control services required by the Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.03 GENERAL QUALITY CONTROL

- A. The Contractor shall be responsible for maintaining and ensuring quality control over subcontractors, suppliers, manufacturers, materials, equipment, products, services, site conditions and workmanship to product work of specified quality. The completed work shall be of high quality throughout.

1.04 WORKMANSHIP

- A. Comply with well-known standards recognized by each trade except when more

restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.

- B. Perform work by persons qualified to produce workmanship of specified quality. Said qualifications shall be determined by well-known standards recognized by the trade for each respective portion of contract work.
- C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration and racking.

1.05 MANUFACTURER'S INSTRUCTIONS

- A. Comply with instructions in full detail, including each step in sequence. Should instructions conflict with Contract Documents, request clarification from Architect before proceeding.

1.06 MANUFACTURER'S CERTIFICATES

- A. When required by individual Specifications Section, submit manufacturer's certificate and supporting documentation, in duplicate, that products meet or exceed specified requirements.
- B. ASBESTOS FREE MATERIALS - Manufacturer and/or supplier shall provide a written and notarized statement on manufacturer's company letterhead to certify and warrant that product (s) utilized on project are asbestos free.

1.07 MOCKUPS

- A. When required by individual Specifications Section, erect complete, full scale mockup of assembly at Project Site.

1.08 MANUFACTURER'S FIELD SERVICES

- A. When specified in respective Specification Sections, require supplier and/or manufacturer to provide qualified personnel to observe field conditions, conditions of surfaces and installation, quality of workmanship, test, adjust and balance of equipment as applicable and to make appropriate recommendations.
- B. Representative shall submit written report to Owner listing observations, recommendations, and certifying full conformance and compliance with manufacturers standards or requirements.

1.09 TESTING LABORATORY SERVICES

- A. The County shall employ and pay for services of an Independent Testing Laboratory to perform inspections, tests for construction materials (soils, concrete) and threshold inspections.
- B. Services will be performed in accordance with requirements of governing authorities and with specified standards.

- C. Reports will be submitted to the County, Contractor and Architect giving observations and results of tests, indicating compliance or noncompliance with specified standards and with Contract Documents.
- D. Contractor shall cooperate with testing laboratory personnel; furnish tools, samples of materials, design, mix equipment, storage and assistance as requested.
 - 1. The contractor shall be responsible for notifying the testing laboratory at least 24 hours prior to expected time for operations requiring testing services. Longer length of notice to testing laboratory shall be provided by Contractor when required by the testing laboratory to ensure the timely scheduling and performance of all tests required.
 - 2. The Contractor is responsible for obtaining and paying tests including but not limited to test and balance, portable water bacteriological tests and test required in individual sections throughout the Project Manual.
- E. The costs of any tests which fail will be paid for by the Contractor. The amount to be reimbursed to the County by the Contractor, will be the amount invoiced to the County by the testing laboratory in accordance with the testing services fees set forth in its contract with the County.

1.10 TEMPERATURE/HUMIDITY LOG

- A. The Contractor shall be responsible for preparing rain, temperature and humidity measuring devices at the project site and maintaining a log of temperature and humidity measurements.
- B. Said log shall contain a daily record of exterior temperature, rainfall amount and humidity conditions and where environmental conditions are specified in individual sections, a daily record of the temperature and humidity conditions where the work of those sections is stored and installed.
- C. The Temperature/Humidity Log shall be available to the Project Manager as part of the Contract Documents.

1.11 RESPONSIBILITIES

- A. The Owner shall provide inspections, tests and similar quality control services, specified in individual Specification Sections and these services include those specified to be performed by an independent agency and not by the Contractor.
- B. The Contractor shall cover all costs of tests or inspections to evaluate means and methods of installation performed as a substitution and not as originally specified.
 - 1. Re-testing: The Contractor is responsible for re-testing where results of required inspections, test or similar services prove unsatisfactory and do not indicate compliance with Contract Documents requirements, regardless of whether the original test was the Contractor's responsibility.

- a. Cost of re-testing construction revised or replaced by the Contractor is the Contractor's responsibility, where required tests were performed on original construction.
2. Associated Services: The Contractor shall cooperate with agencies performing required inspections, tests and similar services and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to:
 - a. Providing access to the work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.
 - b. Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.
 - c. Providing facilities for storage and curing the test samples.
 - d. Providing the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
 - e. Security and protection of samples and test equipment at the Project site.
- C. Duties of the Testing Agency: The independent testing agency engages to perform inspections, sampling and testing of materials and construction specified in individual Specification Sections shall cooperate with Architect and Contractor in performance of its duties, and shall provide qualified personnel to perform required inspections and tests.
 1. The agency shall notify the Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. The agency is not authorized to release, revoke, alter or enlarge requirements of the Contract Documents, or approve or accept any portion of the Work.
 3. The agency shall not perform any duties of the Contractor.
- D. Coordination: The Contractor and each agency engaged to perform inspection, tests and similar services shall coordinate the sequence of activities to accommodate required services with a minimum of delay. In addition, the Contractor and each agency shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
 1. The Contractor is responsible for scheduling times for inspections, tests, taking samples and similar activities.

1.12 SUBMITTALS

- A. Qualification for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, which are pre-qualified as complying with Recommended Requirements for Independent Laboratory qualification by the

American Council of Independent Laboratories, and which specialize in the types of inspections and tests to be performed.

1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the State in which the Project is located.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.01 REPAIR AND PROTECTION

- A. General: Upon completion of inspection, testing, sample-taking and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes. Comply with Contract Document requirements for Cutting and Patching.
- B. Protect construction exposed by or for quality control service activities, and protect and repaired construction.
- C. Repair and protection is the Contractor's responsibility regardless of the assignment of responsibility for inspection, testing or similar services.

END OF SECTION 01400

SECTION 01410
TESTING LABORATORY SERVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Selection and payment
- B. Contractor Submittals
- C. Laboratory responsibilities
- D. Laboratory reports
- E. Limits on testing laboratory authority
- F. Contractor responsibilities
- G. Schedule of inspections and tests

1.02 REFERENCES

- A. ANSI/ASTM D3740 - Practice for Evaluation of Agencies Engages in testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
- B. ANSI/ASTM E329 - Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction.

1.03 SELECTION AND PAYMENT

- A. Owner will employ and pay for services of an independent testing laboratory to perform specified inspection and testing.
- B. Employment of testing laboratory shall in no way relieve Contractor of obligation to perform work in accordance with requirements of Contract Documents.

1.04 QUALITY ASSURANCE

- A. Comply with requirements of ANSI/ASTM E329 and ANSI/ASTM D3740
- B. Laboratory: Authorized to operate in state in which Project is located.
- C. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.
- D. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to either National Bureau of Standards (NBS) Standards or accepted values of natural physical constants.

1.05 LABORATORY RESPONSIBILITIES

- A. Test samples of mixes
- B. Provide qualified personnel at site when required. Cooperate with Orange County and Contractor in performance of services.
- C. Perform specified inspection, sampling, and testing of Products in accordance with specified standards.
- D. Ascertain compliance of materials and mixes with requirements of Contract Documents.
- E. Promptly notify Orange County and Contractor of observed irregularities or non-conformance of Work or Products.
- F. Perform additional inspections and test required by Orange County.
- G. Attend preconstruction conferences and progress meetings.

1.06 LABORATORY REPORTS

- A. After each inspection and test, promptly submit four copies of laboratory report to Orange County, and to Contractor.
- B. Include:
 - 1. Date issued
 - 2. Project title and number
 - 3. Name of inspector
 - 4. Data and time of sampling or inspection
 - 5. Identification of product and Specifications Section
 - 6. Location in the Project
 - 7. Type of inspection or test
 - 8. Date of test
 - 9. Results of tests
 - 10. Conformance with Contract Documents
- C. When requested by Orange County, provide interpretation of test results.

1.07 LIMITS ON TESTING LABORATORY AUTHORITY

- A. Laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
- B. Laboratory may not approve or accept any portion of the work.
- C. Laboratory may not assume any duties of Contractor
- D. Laboratory has no authority to stop the work.

1.08 CONTRACTOR RESPONSIBILITIES

- A. Cooperate with laboratory personnel, and provide access to the work.
- B. Provide incidental labor and facilities to provide access to work to be tested, to obtain and handle samples at the site or at source of products to be tested, to facilitate tests and inspections, storage and curing of test samples.
- C. Notify Orange County and laboratory 24 hours prior to expected time for operations requiring inspection and testing services.
- D. Arrange with laboratory and pay for additional samples and tests required by Contractor beyond specified requirements.

1.09 SCHEDULE OF INSPECTIONS AND TESTS

- A. Testing required:
 - 1. Provide concrete mix designs.
 - 2. Strength test for each 50 cubic yard of concrete placed.

END OF SECTION 01410

SECTION 01500
TEMPORARY FACILITIES

PART 1 GENERAL

1.01 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.

1.02 SUMMARY

- A. This Section specifies requirements for temporary services and facilities, including utilities, construction and support facilities, security and protection.
- B. Actual requirements for temporary facilities will be determined after the bid is awarded, with the successful bidder.
- C. Temporary utilities required include but are not limited to:
1. Water service and distribution
 2. Temporary electric power and light
 3. Telephone service
 4. Sanitary facilities
- D. Temporary construction and support facilities required include but are not limited to:
1. Temporary heat and ventilation as required to facilitate construction process and personnel.
 2. Field office and storage sheds.
 3. Sanitary facilities, including drinking water.
 4. Temporary enclosures.
 5. Hoists and temporary elevator use.
 6. Temporary project identification signs and bulletin boards
 7. Waste disposal services.
 8. Rodent and pest control
 9. Construction aids and miscellaneous services and facilities.
- E. Security and protection facilities required include but are not limited to:
1. Temporary fire protections
 2. Barricades, warning signs, lights
 3. Sidewalk bridge or enclosure fence for the site.
 4. Environmental protection
 5. Fencing
 6. Barriers
 - a. Contractor shall be responsible for providing a temporary 6' high chain link construction fence around the entire perimeter of the construction site. Fence shall be removed upon completion of the

- job. Limits of construction fence indicate on the site plan drawings.
- b. Contractor shall be responsible for providing security measures as required to prevent public entry to construction areas and adjacent properties from damage from construction operations.
 - c. Contractor shall be responsible for providing a protective barrier around trees and plants designated to remain as indicated in plans. Project against vehicular traffic, stored materials, dumping, chemically injurious materials and puddling or continuous running water.
7. Protection of Installed Work
- a. Provide temporary protection for installed products. Control work and traffic in immediate area to avoid damage.
 - b. Provide protective coverings at walls, projections, jambs, sills and soffits of openings. Provide barriers or coverings to protect roof and finished floors and stairs from work and traffic, movement of heavy objects and storage.
8. Security and Maintenance
- a. Fencing shall prevent pedestrian travel through the site for any reason.
 - b. Temporary fencing shall be removed only for construction reasons. If temporary fencing removal is required for non-construction reasons, fencing shall be immediately replaced and secured as soon as the activity for which its removal was required is completed, or if the activity cannot be completely by the end of the work day, temporary security measures shall be taken by the Contractor to ensure that there is no breach of security even during off-work periods.
 - c. 'No Trespassing' and similar signs shall be posted at gates and along fencing adjacent to public areas to inform non-construction personnel of the reason for the fence and potential hazards of entering the construction site. Said signs shall be of a size and spacing to be legible from any point along the entire perimeter of the construction site.

1.03 SUBMITTALS

- A. Temporary Utilities: Submit reports of tests, inspections, meter readings and similar procedures performed on temporary utilities.
- B. Demising Wall Plan: Submit a plan at the Pre-Construction meeting indication the location, construction, and extent of demising walls. Includes connection details indicating method of installation and attachment.

1.04 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations if authorities having jurisdiction, including but not limited to:
 - 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
- B. Standards: Comply with NFPA Code 241, 'Building Construction and Demolition Operations', ANSI-A10 Series standards for 'Safety Requirements for Construction and Demolition', and NECA Electrical Design Library 'Temporary Electrical Facilities'.
1. Refer to 'Guidelines for Bid Conditions for Temporary Job Utilities and Services', prepared jointly by AGC and ASC, for industry recommendations.
 2. Electrical Services: Comply with NEMA, NECA and UL standards and regulations for temporary electric service. Install service in compliance with National Electric Code (NFPA 70).
- C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.05 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 for the permanent service.
- B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, nor permit them to interfere with progress. Do not allow hazardous dangerous, unsanitary conditions, nor public nuisances to develop or persist on the site.
- C. Water Control: Grade site to drain. Maintain excavations free of water. Provide and operate pumping equipment if necessary. Provide silt barriers required by the Florida Department of Transportation St. Johns and any other authority having jurisdiction over the Project.
- D. Cleaning During Construction: Control accumulation of waste materials and rubbish so as to maintain a neat, clean and orderly and safe project; periodically dispose of off-site as needed.

Clean interior areas prior to start of finish work, maintain areas free of dust and other contaminants during finishing operations.

- E. Field Office and Sheds: Office: Weather-tight with lighting, electrical outlets, heating, cooling, and ventilating equipment, and equipped with furniture.
- Storage Sheds for Tools, Materials, and Equipment: Weather-tight with adequate space for organized storage and access, and lighting for inspection of stored materials.

Contractor provide 10 x 8 minimum size office with plan table, telephone, heat, a/c

for projects exceeding 10,000 sq. ft. building area.

- F. Protection of Adjacent Properties: Locate on site construction operations that will generate noise and/or dust as far as practical from occupied structures on adjacent properties so as to minimize disturbances to the occupants of these structures or properties.

Prevent dust or other contaminants caused by construction operations for this Project from being carried to adjacent properties by installation of protective barriers and/or suspension of construction operations during high winds.

Dispose of all construction debris which may be carried to adjacent properties by winds. Remove debris daily and/or more often as required to prevent contamination of adjacent properties.

- G. Removal: Remove temporary materials, equipment and construction facilities prior to Substantial Completion inspection.

Remove temporary utility services prior to Final Completion Inspection.

Clean and repair damage caused by installation or use of temporary facilities. Remove underground installations; grade and complete all work on site as indicated.

- H. Conversion to Public Utilities: General Contractor is to coordinate and arrange with the appropriate utility service providing agencies and make arrangements for the installation and connection to final utilities prior to Final Completion inspection.

General Contractor shall provide any and all coordination, scheduling and layouts as may be required by the service utilities.

- I. Project Identification: Provide a sign as outlined in SECTION 01580 PROJECT SIGN. Locate to provide an unobstructed view from adjoining roadway. Remove project sign upon final completion acceptance.

PART 2 PRODUCTS

2.01 MATERIALS

- A. General: Provide new materials; of acceptable to the Project Manager, undamaged previously used materials in serviceable condition maybe used. Provide materials suitable for the use intended.

- B. Lumber and Plywood:

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 fences and vision barriers, provide exterior type, minimum 3/8" thick plywood.

3. For safety barriers, sidewalk bridges and similar uses, provide minimum 5/8" thick exterior plywood.
 4. For signs and directory boards, provide exterior type, Grade B-B High Density Concrete Form Overlay Plywood conforming to PS-1 of sizes and thickness indicated.
- C. Paint:
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 interior walls of temporary offices, provide two coats interior latex flat wall paint.
 3. For sign panels and applying graphics, provide exterior grade alkyd gloss enamel over exterior primer.
- D. Tarpaulins: Provide waterproof, fire-resistant, UL labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosure provide translucent nylon reinforced laminated polyethylene or polyvinyl chloride fire retardant tarpaulins.
- E. Water: Provide portable water approved by local health authorities.
- F. Open-Mesh Fencing: Provide 11-gage, galvanized 2-inch, chain link fabric fencing 6-feet high with galvanized barbed wire top strand and galvanized steel pipe post, 1 1/2 inch I.D. for line posts and 2 inch I.D. for corner posts.

2.02 EQUIPMENT

- A. General: Provide new equipment: if acceptable to the Project Manager, undamaged, previously used equipment in serviceable condition may be used. Provide equipment suitable for use intended.
- B. Water Hoses: Provide 3/4" heavy-duty, abrasion-resistant, flexible rubber hoses 100 ft. Long, with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shut-off nozzles at hose discharge.
- C. Electrical Outlets: Provide properly configured NEMA polarized outlets to prevent insertion of 110-120 volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset bottom and pilot light, for connection of power tools and equipment.
- D. Electrical Power Cords: Provide grounded extension cords; use Ahard-service≅ cords where exposed to abrasion and traffic. Provide water proof connectors to connect separate lengths of electric cords, if single lengths will not reach areas where construction activities are in progress.

- E. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered glass enclosures, where exposed to breakage. Provide exterior fixtures where exposed to moisture.
- F. 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.
- G. Temporary Offices: Provide prefabricated or mobile units or similar job-built construction with lockage entrances, operable windows and serviceable finished. Provide heated and air-conditioned units on foundations adequate for normal loading.
- H. Temporary Toilet Units: Provide self-contained single-occupant toilet units of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar nonabsorbent material.
- I. First Aid Supplies: Comply with governing OSHA and any other regulations.
- J. Fire Extinguishers: Provide hand-carried, portable UL-rated, class AA≅ 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 NEPA recommended classes for the exposures.
 - 1. Comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.

PART 3 EXECUTION

3.01 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.

3.02 TEMPORARY UTILITY INSTALLATION

- A. General: Engage the appropriate local utility company to install temporary service or connect to existing service. Where the company provides only part of the service, provide the remainder with matching, compatible materials and equipment; comply with the company's recommendations.
 - 1. Arrange with the company and existing users for a time when service can be interrupted, where necessary, to make connections for temporary services.

2. Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.
 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 of use charges for temporary facilities are not chargeable to the Owner or Architect, and will not be acceptable as a basis of claims for a Change Order.
- B. Water Service: Install water service and distribution piping of sized and pressures adequate for construction until permanent water service is in 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. Coordinate with the Owner for HVAC shutdown and return air systems in Project work areas.
 2. In addition to the demising wall installation, and providing air filtration specified, shutdown the return air systems in each area where Work activities are underway. Re-establish the return air systems as work is completed.
 3. Provide temporary HVAC to maintain the existing level of service during shutdown periods.
- D. Temporary Lighting: Whenever 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, and will provide adequate illumination for construction operations and traffic conditions.
- E. Temporary Telephones: Provide temporary telephone service for all personnel engaged in construction activities, throughout the construction period. Install telephone on a separate line for each temporary office and first aid station. Where an office has more than two occupants, install a telephone for each additional occupant or pair of occupants.
1. At each telephone, post a list of important telephone numbers.
- F. Sewers and Drainage: If sewers are available, provide temporary connections to remove effluent that can be discharged lawfully. If sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds and similar facilities. If neither sewers nor drainage facilities can be lawfully used for discharge or effluent, provide containers to remove and dispose of effluent off the site in a lawful manner.

1. Filter out excessive amounts of soil, construction debris, chemicals, oils and similar contaminants that might clog sewers or pollute waterways before discharge.
- G. Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by run-off of storm water from heavy rains.

3.03 TEMPORARY CONSTRUCTION AND SUPPORT FACILITIES INSTALLATION

- A. Locate field offices, storage sheds, sanitary facilities and other temporary construction and support facilities for easy access.
1. Maintain temporary construction and support facilities until 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 of building lines. Comply with requirements of NFPA 241.
- C. Temporary Heat: Provide temporary heat required by construction activities, for curing or drying of completed installations or 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.
- D. Heating Facilities: Except where use of the permanent system is authorized, provide electric vented self-contained LP gas or fuel oil heaters with individual thermostatic control.
1. Use of gasoline-burning space heaters, open flame, or salamander type heating units is prohibited.
- E. 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 with the building or elsewhere on the site.
- F. Temporary Paving: Construct and maintain temporary roads and paving to support the indicated loading and to withstand exposure to traffic during the construction period. Locate temporary paving the roads, storage areas and parking where the same permanent facilities will be located. Review proposed modifications to permanent paving with the Architect.
1. Coordinate temporary paving development with subgrade grading, compaction, installation, and stabilization of sub-base, and installation of base and finish courses of permanent pavings.

2. Install temporary paving to minimize the need to rework the installations and to result in permanent roads and paved areas that are without damage or deterioration when occupied by the Owner.
 3. Delay installation of the final course of permanent asphalt concrete paving until immediately before Substantial Completion. Coordinate with either conditions to avoid unsatisfactory results.
 4. Extend temporary paving in and around the construction area as necessary to accommodate delivery and storage of materials, equipment usage, administration and supervision.
- G. 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.
- H. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Use of pit-type privies will not be permitted. Provide one toilet for each 15 workers on site and have serviced weekly as a minimum.
- I. Wash Facilities: Install wash facilities supplied with portable 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.
1. Provide safety showers, eye-wash fountains and similar facilities for convenience, safety and sanitation of personnel.
- J. Drinking Water Fixtures: Provide drinking water fountains including paper supply.
1. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 degree F (7 to 13 degree C).
- K. Dewatering Facilities and Drains: For temporary drainage and dewatering facilities and operations not directly associated with construction activities per Orange County water management requirements. Maintain the site, excavations and construction free of water.
- L. Demising Walls: Provide temporary enclosure 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 square feet or less with plywood or similar materials.
 3. Close openings through floor or roof decks and horizontal surfaces with load-bearing wood-framed construction.
 4. Where temporary wood or plywood enclosure exceeds 100 square feet in area, use UL-labeled fire-retardant treated material for framing and main sheathing.
- M. Temporary Lifts and Hoist: Provide facilities for hoisting materials and employees. Truck cranes and similar devices used for hoisting material are considered 'tools and equipment' and not temporary facilities.
- N. Temporary Elevator Use: By permission of the Owner only. Obtain written permission prior to using elevator for any construction purposes.
- O. Temporary Exterior Lighting: Maintain exterior yard and sign lights so that signs are visible when work is being performed.
- P. 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 weather or 3 days when the temperature is expected to raise above 80 deg. F. Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of materials in a lawful manner.
- Q. Rodent and Pest Control: Before foundation work has been completed, retain a local exterminator or pest control company to recommend practices to minimize attraction and harboring of rodents, roaches and other pests. Employ this service to perform extermination and control procedures at regular intervals so the project will be relatively free of pests and their residues at Substantial Completion. Perform control operations in a lawful manner using environmentally safe materials.
- R. Project Identification and Temporary Signs: Prepare project identification and other signs of the 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.

3.04 SECURITY AND PROTECTIONS 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 Project Manager.
- B. Temporary Fire Protection: Until fire protection needs are supplied by permanent 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 141 Standard for Safeguarding Construction, Alternations 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 in 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. Permanent Fire Protection: At the earliest feasible date in each area of the Project, complete installation of the permanent fire protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.
- D. 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.
- E. Enclosure Fence: When 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.
- F. 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 materials to minimize the opportunity for theft and vandalism.

- G. 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 sub-soil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment which produce harmful noise. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near the site.

3.05 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 day 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, or 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 facility. Repair damaged work, clean exposed surfaces and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that constitute temporary facilities are property of the Contractor. The Owner reserves the right to take possession of Project identification signs.
 2. Remove temporary paving that is not intended for or acceptable for integration into permanent paving. Where the area is intended for landscape development, remove soil and aggregate fill that does 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 which might impair growth of plant materials or lawns. Repair or replace street pavings, curbs and sidewalks at the temporary entrances, as required by the governing authority.
 3. At Substantial Completion, clean and renovate permanent facilities that have been used during the construction period, including but not limited to:

- a. Replace air filters and clean inside of ductwork and housings.
- b. Replace significantly worn parts and parts that have been subject to unusual operating conditions.
- c. Replace lamps that are burned out or noticeably dimmed by substantial hours of use as noted by the Owner's representative.

END OF SECTION 01500

SECTION 01576
MAINTENANCE OF TRAFFIC

PART 1 GENERAL

1.01 DEFINITION

- A. The term, maintenance of traffic, as used herein, includes all facilities, devices and operations required for the safety and convenience of the public during length of the project.

1.02 RELATED WORK

- A. Drawings and general provisions of the Contract in the general and supplemental conditions.

1.03 RESPONSIBILITY

- A. Responsibility for maintenance of traffic begins on the first day of work. Provide for normal access to residences and businesses along, or adjacent to the project.

1.04 REFERENCES

- A. All signs, barricades and road offset dimensions shall be in accordance with the Florida D.O.T. Manual of Traffic Control and Safe Practices for Street and Highway Construction, Maintenance and Utility Operations.
- B. Maintenance of traffic activities are subject to the approval of the Florida Department of Transportation, and or Orange County Department of Traffic Engineering, unless Project is located within a City's jurisdiction.

1.05 LIABILITY

- A. Requirements, procedures and references made herein shall in no way act as a waiver of liability for contractor and its surety.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.01 MAINTENANCE OF ROADWAY SURFACES

- A. Maintain all lanes being used for maintenance of traffic to ensure a substantial, smooth and safe riding surface under all weather conditions.

3.02 MAINTENANCE OF TRAFFIC CONTROL DEVICES

- A. Traffic control devices as required shall be kept in correct position, properly directed, clearly visible and clean at all times.

3.03 INSTALLATION

- A. All traffic control devices shall be erected prior to the creation of any hazardous condition and in conjunction with any necessary rerouting of traffic.
- B. Immediately remove, turn or cover any devices which do not apply to existing conditions.
- C. Furnish and maintain all traffic control devices including signs, barricades, and panels.

3.04 FLAGMEN

- A. Provide personnel with required equipment, to direct traffic when required by construction operations in numbers and locations approved by the authority having jurisdiction.

END OF SECTION 01567

SECTION 01580
PROJECT SIGN

PART 1 GENERAL

1.01 DESCRIPTION

- A. Furnish, install and maintain one project identification sign, 48 inches x 96 inches in size. Contractor shall verify maximum allowable job site sign size specifications prior to fabrication of sign. Contractor shall be required to obtain and pay for any and/or all permits and approvals for the erection of said project identification sign. Unless local authorities have different maximum size requirements that would not allow for such size.
- B. Content required on sign:
 - 1. Title of project/address of project
 - 2. Name of Owner/name of Orange County chairman and commissioner(s). All names shall be those in office on the date the construction contract is awarded.
 - 3. Title and names of:
 - a. Architect of Record
 - b. General Contractor
- C. No other signs or advertising will be permitted on the project site, without approval of County, except signs for safety purposes.

1.02 CODES

- A. Where required by Local Code, comply with minimum structural and foundation requirements.

1.03 SUBMITTALS

- A. Shop Drawings, showing:
 - 1. Layout, showing sizes and styles of letters
 - 2. Type of paint.

PART 2 PRODUCTS

2.01 SIGN MATERIALS

- A. Southern Pine No. 2 pressure treated, AWPB LP-2. Surfaced four sides.
- B. Plywood: A-C EXT MDO APA PSI, with medium density overlay, 3/4" thick.

- C. Nails: Hot-dip galvanized
- D. Paint: Manufactured by Sherwin-Williams or equal
 - 1. Primer: A-100 Ext. Wood Primer Y24W20
 - 2. Second, and third coats: Industrial Enamel B54(S-W)

2.02 LETTERING

- A. All Lettering shall be Times Roman Bold Style

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install members plumb, in true alignment, and in concrete foundations by Local Code.
 - 1. Locate where directed by Owner.
- B. Securely attach framing members to each other and to foundations.

3.02 PAINT

- A. Paint all exposed surfaces of sign and support construction.

3.03 REMOVAL

- A. Remove sign, framing and foundations no later than date of Final Completion.

END OF SECTION 01580

SECTION 01600
MATERIALS AND EQUIPMENT

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements governing the Contractor's selection of products for use in the Project.
- B. The Contractor's Construction Schedule and the Schedule of Submittals are included under Section 01300 -Submittals.
- C. Administrative procedures for handling requests for substitutions made after award of the Contract are included under Section 01631 'Product Substitution'.

1.03 DEFINITIONS

- A. Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents such as 'specialties', 'systems', 'structure', 'finishes', 'accessories', and similar terms. Such terms are self-explanatory and have well recognized meanings in the construction industry.
 - 1. 'Products' are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term 'product' includes the term 'material', 'equipment', 'system' and terms of similar intent.
 - a. 'Named Products' are items identified by manufacturer's product name, including make or model designation, indicated in the manufacturer's published product literature, that is current as of the date of the Contract Documents.
 - b. 'Foreign Products', as distinguished from 'domestic products', are items substantially manufactured (50 percent or more of value) outside of the United States and its possessions; or produced or supplied by entities substantially owned (more than 50 percent) by persons who are not citizens nor living within the United States and its possessions.
 - 2. 'Materials' are products that are substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the work.
 - 3. 'Equipment' is a product with operational parts, whether motorized or manually operated, that requires service connections such as wiring or

pipng.

1.04 QUALITY ASSURANCE

- A. Source Limitations: To the fullest extent possible, provide products of the same kind, from a single source.
- B. Compatibility of Options: When the Contractor is given the option of selecting between two or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.
- C. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view in occupied spaces or on the exterior.
 - 1. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on accessible surface that is not conspicuous.
 - 2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface which is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data.
 - a. Name of product and manufacturer
 - b. Model and serial number
 - c. Capacity
 - d. Speed
 - e. Ratings
 - f. Additional pertinent information

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle products in accordance with the manufacturer's recommendations, using means and methods that will prevent damage, deteriorating and loss, including theft.
 - 1. Schedule delivery to minimize long-term storage at the 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 the site in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.

4. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
5. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
6. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.
7. Store products subject to damage by the elements above ground, under cover in a weather tight enclosure, with ventilation adequate in prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

PART 2 PRODUCTS

2.01 PRODUCT SELECTION

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, unused at the time of installation.
 1. Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.
 2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situation on other projects.
- B. Product Selection Procedures: Product selection is governed by the Contract Documents and governing regulations, not by previous project experience. Procedures governing product selection include the following:
 1. Proprietary Specification Requirements: Where only a single product or manufacturer is named, provide the product indicated. No substitutions will be permitted.
 - a. Where products or manufacturers are specified by name, accompanied by the term 'or equal' or 'or approved equal' comply with the Contractor Document provisions concerning 'substitutions' to obtain approval for use of an unnamed product.
 2. Non-Proprietary Specifications: When the Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to use of those products only, the Contractor may propose any available product that complies with Contract requirements. Comply with Contract Document provisions concerning 'substitutions' to obtain approval for use of an unnamed product.

3. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
4. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements, and are recommended by the manufacturer for the application indicated.
 - a. Manufacturer's recommendations may be contained in published product literature, or by the manufacturer's certification of performance.
5. Compliance with Standards, Codes and Regulations: Where the Specifications only require compliance with an imposed code, standard or regulation, select a product that complies with the standards, codes or regulations specified.
6. Visual Matching: Where Specifications require matching an established Sample, the Architect's decision will be final on whether a proposed product matches satisfactorily.
 - a. Where no product available within the specified category matches satisfactorily and also complies with other specified requirements, comply with provisions of the Contract Documents concerning 'substitutions' for selection of a matching product in another product category, or for noncompliance with specified requirements.
7. Visual Selection: Where specified product requirements include the phrase A... as selected from manufacturer's standard colors, pattern, textures... or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Architect will select the color, pattern and texture from the product line selected.
8. Asbestos free materials: No products containing asbestos shall be used for any part of the work for this product. Provide verification.

PART 3 EXECUTION

3.01 INSTALLATION OF PRODUCTS

- A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each project securely in place, accurately located and aligned with other work.
 1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

Orange County
Capital Projects Division
Orlando, Florida

Yucatan Playground Cover Invest
6400 Yucatan Drive
Orlando, Florida

END OF SECTION 01600

SECTION 01631
PRODUCTS SUBSTITUTIONS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling request for substitutions.
- B. The Contractor's Installation Schedule and the Schedule of Submittals are included under Section Submittals.
- C. Standards: Refer to Section 01095 Reference Standards and Definitions for applicability of industry standards to products specified.
- D. Procedural requirements governing the Contractor's selection of products and product options are included under Section Materials and Equipment.

1.03 DEFINITIONS

- A. Definitions used in this Article are not intended to change or modify the meaning of other terms used in the Contract Documents.
- B. Substitutions: Requests for changes in products, materials, equipment, and methods of installation required by Contract Documents proposed by the Contractor after award of the Contract are considered requests for substitutions. The following are not considered substitutions:
 - 1. Only substitutions requested by Contractor are considered as included in the Contract Documents and are not subject to requirements specified in Section for substitutions.
 - 2. Revisions to Contract Documents requested by the Owner or Architect.
 - 3. Specified options of products and installation methods included in Contract Documents.
 - 4. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.04 SUBMITTALS

- A. Substitution Request Submittal: Request for substitution will be considered if received within thirty (30) days after commencement of the Work, as long as this

time allowance will not impact the construction schedule,

1. Submit three (3) copies of each request for substitution for consideration. Submit requests in the form and in accordance with procedures required for Change Order proposals.
2. Identify the product, or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers. Provide complete documentation showing compliance with the requirements for substitution, and the following information, as appropriate:
 - a. Product Data, including Drawings, and descriptions of products, fabrication and installation procedures.
 - b. Samples, where applicable or requested.
 - c. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements such as size, weight, durability, performance and visual effect.
 - d. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate Contractor's, that will become necessary to accommodate the proposed substitution.
 - e. A statement indicating the substitution's effect on the Contractor's construction schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
 - f. Cost information, including a proposal of the net change, if any in the Contract Sum.
 - g. Certification by the Contractor that the Substitution proposed is equal-to or better in every significant respect to that required by the Contract Documents, and that it will perform adequately in the application indicated. Include the contractor's waiver of rights to additional payment or time, that may subsequently become necessary because of the failure of the substitution to perform adequately.
3. Architects Action: Within two weeks of receipt of the request for substitution, the Architect will request additional information or documentation necessary for evaluation of the request if needed. Within two (2) weeks of receipt of the request, or one week of receipt of the additional information or documentation, which ever is later, the Architect will notify the Contractor of acceptance or rejection of the proposed substitution. If a decision on use of a proposed substitute cannot be made or obtained within the time allocated, use the project specified by name. Decision on the use of a product substitution or its rejection by the Architect is considered final. Acceptance will be in the form of a Change Order.

PART 2 PRODUCTS

2.01 SUBSTITUTIONS

- A. Conditions: The Contractor's substitution request will be received and considered by the Architect when one or more of the following conditions are satisfied, as determined by the Architect; otherwise request will be returned without action except to record noncompliance with these requirements.
1. Extensive revisions to Contract Documents are not required.
 2. Proposed changes are in keeping with the general intent of Contract Documents.
 3. The request is timely, fully documented and properly submitted.
 4. The specified product or method of construction cannot be provided within the Contract Time. The request will not be considered if the product or method cannot be provided as a result of failure to pursue the work promptly or coordinate activities properly.
 5. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
 6. A substantial advantage is offered to the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities the Owner may be required to bear. Additional responsibilities for the Owner may include additional compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner or separate Contractors, and similar consideration.
 7. The specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.
 8. The specified product or method of construction cannot be coordinated with other materials, and where the Contractor certifies that the proposed substitution can be coordinated.
 9. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provide the required warranty.
- B. The Contractor's submittal and Project Manager's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.
- C. Substitution request constitutes a representation that the Contractor:
1. Has investigated proposed product and determined that it meets or exceeds, in all respects, specified product.

2. Will provide the same warranty for substitution as for specified product.
3. Will coordinate installation and make other changes which may be required for work to be complete in all respects.
4. Waives claims for additional costs which may subsequently become apparent. All costs associated with the substitution will be paid by the Contractor regardless of approvals given, and regardless of subsequent difficulties experienced as a result of substitutions.

END OF SECTION 01631

SECTION 01700
PROJECT CLOSE-OUT

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements for project close-out, including but not limited to:
1. Inspection procedures
 2. Project record document submittal. (Substantial Completion requirements)
 3. Operating and Maintenance Manual Submittal (Substantial Completion requirements).
 4. Submittal of warranties (Substantial Completion requirement).
 5. Final cleaning
- B. Close-out requirements for specific construction activities are included in the appropriate Sections in Divisions 2 through 49.
- C. Final Payment to be made when the County has received all required close-out documents.

1.03 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for Certification of Substantial Completion, complete the following: List exceptions in the request.
1. In the Application for Payment that coincided with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
 - a. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the work is not complete.
 2. Advise Owner of pending insurance change-over requirements.
 3. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.
 4. Obtain and submit releases enabling the Owner unrestricted use of the work and access to services and utilities; include occupancy permits, operating

certificates and similar releases.

5. Complete final clean up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.
- B. Inspection Procedures: On receipt of a request for inspection, the Project Manager will either proceed with inspection or advise the Contractor of unfilled requirements. The Project Manager will prepare the Certificate of Substantial Completion following inspection, or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.
1. Results of the completed inspection will form the basis of requirements for final acceptance.
 2. Should the project fail to meet the standards required for Substantial Completion as defined in the documents, the Contractor will pay the expense of a second inspection by the Architect/Consultants and the Owner. Cost will be deducted from the Contractor's retainage.

1.04 FINAL ACCEPTANCE

- A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following list exceptions in the request:
1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and complete operations where required.
 2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
 3. Submit a certified copy of the Architect or Owner's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, and the list has been endorsed and dated by the Project Manager.
 4. Submit final meter readings for utilities, a measured record of stored fuel and similar data as of the date of Substantial Completion, or when the Owner took possession of the responsibility for corresponding elements of the Work.
 5. Submit consent of surety to final payment.
 6. Submit a final liquidated damages settlement statement
 7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
- B. Reinspection Procedure: The Architect will reinspect the work upon receipt of notice that the work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of

circumstances acceptable to the Architect.

1. Upon completion of reinspection, the Architect will prepare a certification of final acceptance, or advise the contractor of work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.

1.05 RECORD DOCUMENT SUBMITTALS

- A. General: Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Architect's reference during normal working hours.
- B. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation; where the installation varies substantially from the work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date. Provide for project photographs if deemed necessary by Owner's representative.
 1. Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of the work.
 2. Mark new information that is important to the Owner, but was not shown on Contract Drawings or Shop Drawings.
 3. Note related Change Order numbers where applicable.
 4. Organize record drawing sheets, and print suitable titles, dates and other identification on the cover of each set.
 5. Provide three (3) additional sets of black line drawing sets of As-Built Drawings.
- C. Record Specifications: Maintain one complete copy of the Project Manual, including addenda, and one copy of other written construction documents such as Change Orders and modifications issued in printed form during construction. Mark these documents to show substantial variations in actual work performed in comparison with the text of the specifications and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation. Note related record drawing information and Project Data.
 1. Upon completion of the Work, submit record Specifications to the Architect for the Owner's records.
- D. Record Project Data: Maintain one copy of each Product Data submittal. Mark these documents to show significant variation in actual work performed in comparison with information submitted. Include variations in products delivered to

the site, and from the manufacturer's installation instructions and recommendations. Give particular attention to concealed products and portions of the Work which cannot otherwise be readily discerned later by direct observation. Note related Change Orders and mark-up of record drawings and Specifications.

1. Upon completion of mark-up, submit complete set of record Product Data in the three ring binder (indexed) to the Architect for the Owners records.
- E. Record Sample Submitted: Immediately prior to the date or dates of substantial completion, the Contractor will meet at the site with the Architect and the Owners personnel to determine which of the submitted Samples that have been maintained during progress of the work are to be transmitted to the Owner for record purposes. Comply with delivery to the Owners Sample storage area.
- F. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record-keeping and submittals in connection with actual performance of the work. Immediately prior to the date or dates of substantial completion, complete miscellaneous record and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Project Manager for the Owner's records.
- G. Maintenance Manuals: Organize operating and maintenance data into five (5) suitable sets of manageable size. Bind properly indexed data in individual heavy-duty 2-inch, 3-ring vinyl covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Include the following types of information:
1. Emergency instructions
 2. Spare parts list
 3. Copies of warranties
 4. Wiring diagrams
 5. Recommended turn-around cycles
 6. Inspection procedures
 7. Shop Drawings and Product Data
 8. Fixture lamping schedule

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.01 CLOSE-OUT PROCEDURES

- A. Operating and Maintenance Instructions: Arrange for each installer of equipment that required regular maintenance. If installers are not experienced in procedures, provide instruction by manufacturer's representatives. All items to be provided or competed prior to Certificate of Substantial Completion being issued by the Owner. Include a detailed review of the following items:
1. Maintenance manuals
 2. Record documents

3. Spare parts and materials
4. Tools
5. Lubricants
6. Fuels
7. Identification systems
8. Control sequences
9. Hazards
10. Cleaning
11. Warranties and bonds
12. Maintenance agreements and similar continuing commitments
13. On site instructions to County maintenance personnel on major systems operations such as HVAC as per technical specifications.

B. As part of instruction for operating equipment, demonstrate the following procedures, prior to the Owner issuing Certificate of Substantial Completion:

1. Start-up
2. Shutdown
3. Emergency operations
4. Noise and vibration adjustments
5. Safety procedures
6. Economy and efficiency adjustments

3.02 PROJECT CLOSE-OUT MANUALS AT SUBSTANTIAL COMPLETION

- A. Submit Project Close-out Manuals prior to issuance of final application for payment. Provide three (3) copies.
- B. Bind in commercial quality 8.5 x 11" three ring binder, indexed with hardback, cleanable, plastic covers.
- C. Label cover of each binder with typed title PROJECT CLOSE-OUT MANUAL, with title of project; name, address, and telephone number of Contractor and name of responsible Principal.
- D. Provide table of contents: Neatly typed, in the following sequence:
1. Final Certificate of Occupancy
 2. Warranty Service Subcontractors Identification List
 3. Final Lien Waivers and Releases
 4. Warranties and Guarantees
 5. Systems Operations and Maintenance Instruction
 6. Manufacturer's Certificates and Certifications
 7. Maintenance Service Contracts
 8. Spare Parts Inventory List
 9. Special Systems Operating Permits or Approvals
 10. Asbestos free materials notarized statement
- E. Provide all documents for each section listed. List individual documents in each section in the Table of Contents, in the sequence of the Table of Contents of the

Project Manual.

- F. Identify each document listed in the Table of Contents with the number and title of the specification section in which specified, and the name of the product or work item.
- G. Separate each section with index to sheets that are keyed to the Table of Contents listing.
- H. Warranty Service Subcontractors List shall identify subcontractor supplier, and manufacturer for each warranty with name, address and emergency telephone number.
- I. Electronic Close-out DVD: At the completion of the project, submit one copy of a DVD with entire project close out information below in PDF format. All letter, legal and brochure size sheets shall be portrait and the As-build drawings will be landscape. All fonts will be Arial. All items will be in PDF with OCR (Optical Character Recognition). This will enable a search engine to identify words on the scanned documents.
 - 1. Contacts: Set up a separate PDF for the contacts. No bookmarks are needed for this section.
 - 2. As-Built: All as-built drawings will be landscape.
 - 3. Submittals: All technical submittal items (approved and approved as noted) will be provided and sorted by Division. Bookmarks will be needed for the appropriate divisions.
 - 4. Operations and Maintenance Manual: Specify the Division name only in the bookmarks. Please note that all items will be in PDF with OCR (Optical Character Recognition). This will enable a search engine to identify works on the scanned documents.
 - 5. Permitting: This should include the Certificate of Occupancy and any other document that the Project Manager may include pertaining to the permitting for the project.

3.03 FINAL CLEANING

- A. General: General cleaning during construction is required by the General Conditions and included in Section - Temporary Facilities.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
 - 1. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion.
 - a. Remove labels that are not permanent labels.
 - b. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compound and other substances that are

- noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
- c. Clean exposed exterior and interior hard-surfaced finished to a dust-free condition, free of stains, films and similar foreign substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.
 - d. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
 - e. Clean the site, including landscape development areas, of rubbish, litter and other foreign substances. Sweep paved areas broom clean; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface. Remove waste and surplus materials from the site in an appropriate manner.
- C. Pest Control: Engage an experienced exterminator to make a final inspection, and rid the Project of rodents, insects and other pests.
- D. Removal of Protection: Remove temporary protection and facilities installed for protection of the work during construction.
- E. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.
- 1. Where extra materials of value remaining after completion of associated work have become the Owner's property, arrange for disposition of these materials as directed.

END OF SECTION 01700

SECTION 01740
WARRANTIES AND BONDS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contractor Documents, including manufacturer's standard warranties on products and special warranties.
1. Refer to the General Conditions for terms of the Contractors special warranty of workmanship and materials.
 2. General close-out requirements are included in Section 01700 Project Close-Out.
 3. Specific requirements for warranties for the work and products and installations that are specified to be warranted, are included in the individual Sections.
 4. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.
- B. Disclaimers and Limitations: Manufacturers' disclaimers and limitations on product warranties to not relieve the Contractor of the warranty on the work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.03 WARRANTY REQUIREMENTS

- A. Related Damages and Losses: When correcting warranted work that has failed, remove and replace other work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted work.
- B. Reinstatement of Warranty. When work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. Replacement Cost: Upon determination that work covered by a warranty has failed, replace or rebuild the work to an acceptable condition complying with requirements of Contract Documents.

- D. Owners Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligation, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligation, rights, or remedies.
 - 1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
- E. The Owner reserves the right to refuse to accept work for the Project where a special warranty, certification, or similar commitment is required on such work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

1.04 WARRANTY PERIOD

- A. The Contractor shall participate with the County and the Architects' representative, at the beginning of the tenth month of the warranty period, in conducting an on site review and evaluation of all items of equipment, materials and workmanship covered by the warranties and guarantees. Contractor shall act promptly and without cost to the County to correct all defects, problems, or deficiencies determined as such by the Architect/Owner during on the site review.
- B. All warranties and guarantees shall commence on the date of Substantial Completion except for items which are determined by the County to be incomplete or a non-comply status at the time of Substantial Completion. The coverage commencement date for warranties and guarantees of such work shall be the date of the County's acceptance of that work.
- C. Warranty period shall be manufacturers standard for product specified except where specific warranty periods are specified in individual sections. But in no case less than one year.

1.05 SUBMITTALS

- A. Submit written warranties to the Owner prior to the date certified for Substantial Completion. If the Architect's Certificate of substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the work, submit written warranties upon request of the Project Manager.
 - 1. When a designated portion of the work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Project Manager within fifteen days of completion of that designated portion of the work.
- B. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepared a written

document that contains appropriate terms and identification, ready for executing by the required parties. Submit a draft to the Architect for approval prior to final execution.

1. Refer to individual Sections for specific content requirements, and particular requirements for submittal of special warranties.
- C. Form of Submittal: At Final Completion compile two (2) copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
- D. Bind (3) three sets of warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8 ½ by 11" paper.
1. Provide heavy paper dividers with Celluloid covered tabs for each separate warranty. Mark the 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 the installer.
 2. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS", the Project title or name, and the name of the Contractor.
 3. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

END OF SECTION 01740

SECTION 02 4113
SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for removing selective portions of the site to accommodate new construction
 - 1. Removal of existing structure
 - 2. Removal of play surfacing
 - 3. Concrete sidewalk sections as noted
 - 4. Removal and reinstallation of fencing at locations shown on Drawings.
 - 5. Other demolition detailed on Drawings.

1.2 SUBMITTALS

- A. Submit digital photographs in JPEG format of existing conditions of surfaces, equipment, and adjacent improvements that might be misconstrued as damage related to removal operations. File with Architect prior to start of work. This is in addition to the requirements for the pre-construction video recordings.
- B. Inventory: After selective demolition is complete, submit a list of items that have been removed and salvaged.

1.3 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent, to that indicated for this Project.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Standards: Comply with ANSI A10.6 and NFPA 241.
- D. Predemolition Conference: Review methods and procedures related to selective demolition including, but not limited to, the following:
 - 1. Inspect and discuss condition of construction to be selectively demolished.
 - 2. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - 3. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
 - 4. Review areas where existing construction is to remain and requires protection.

1.4 PROJECT CONDITIONS

- A. Owner will not occupy the site during selective demolition
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
 - 1. Owner assumes no responsibility for actual condition of items or

structures to be demolished.

- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Owner will remove hazardous materials under a separate contract.
- E. Items indicated to be removed but of salvageable value to Contractor may be removed from structure as work progresses. Transport salvaged items from site as they are removed.
 - 1. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
- G. Environmental Controls: Use water sprinkling, temporary enclosures, and other methods to limit dust and dirt migration. Comply with governing regulations pertaining to environmental protection.
 - 1. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.
- H. Explosives: Use of explosives will not be permitted.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped.
- B. Survey of Existing Conditions: Correlate with requirements indicated to determine extent of selective demolition required.
 - 1. Record existing conditions by use of preconstruction photographs. Comply with requirements specified in Division 01 Section, Pre-Construction Video Recording.
- C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.

3.3 DEMOLITION

- A. Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Proceed with selective demolition systematically, from higher to lower

level.

2. Cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces.
3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
4. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
5. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
6. Demolish foundation walls to a depth of not less than 12 inches below existing ground surface.
7. Demolish and remove below-grade metal construction.

B. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

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

D. If unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Architect in written, accurate detail. Pending receipt of directive from Architect, rearrange selective demolition schedule as necessary to continue overall job progress without undue delay.

3.4 DISPOSAL OF DEMOLISHED MATERIALS

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

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn demolished materials.

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

3.5 CLEANING

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

END OF SECTION 02 4113

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 - 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 DESCRIPTION OF WORK

- A. Extent of concrete work is shown on drawings, including schedules, notes and details which show size and location of members and type of concrete to be poured. Furnish all labor, materials, services, equipment and hardware required in conjunction with or related to the forming, delivery and pouring of all poured-in-place concrete work.
- B. Concrete Formwork, Reinforcement, Architectural Concrete, Precast Concrete, Post-Tensioned Concrete and special requirements for Tilt-up Concrete Construction are specified in other Division-3 sections.

1.3 QUALIFICATIONS

- A. The concrete supplier shall have a minimum of five years' experience in manufacturing ready-mixed concrete products complying with ASTM C94 requirements for production facilities and equipment. The supplier must be certified according to the National Ready Mixed Concrete Association's Certification of Ready Mixed Concrete Production Facilities.
- B. The concrete contractor shall have a minimum of five years' experience with installation of concrete similar in material, design and extent to that indicated for this Project and whose work has resulted in construction with a record of successful -service performance.

1.4 QUALITY ASSURANCE

The Contractor is responsible for quality control and quality assurance, including workmanship and materials furnished by his subcontractors and suppliers.

- A. Codes and Standards: Comply with provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified:
 - 1. ACI 301 - "Specifications for Structural Concrete for Buildings".
 - 2. ACI 117 - "Specifications for Tolerances for Concrete Construction and Materials."

3. ACI 318 - "Building Code Requirements for Reinforced Concrete".
 4. Concrete Reinforcing Steel Institute (CRSI), "Manual of Standard Practice".
 5. AISC 360, "Specification for Structural Steel Buildings."
 6. ACI 305.1, "Specification for Hot Weather Concreting."
- B. Document Conflict and Precedence: In case of conflict among documents, including architectural and structural drawings and specifications, notify the Architect/Engineer prior to submitting proposal. In case of conflict between and/or among the structural drawings and specifications, the strictest interpretation shall govern, unless specified otherwise in writing by the Architect/Engineer.
- C. Inspection and Testing of the Work: Materials and installed work may require testing and retesting, as directed by the Architect/Engineer, at any time during progress of work. Allow free access to material stockpiles and facilities. Tests, not specifically indicated to be done at the Owner's expense, including retesting of rejected materials and installed work, shall be done at the Contractor's expense. See Testing Laboratory section of the Specifications.
- Inspection or testing by the Owner does not relieve the Contractor of his responsibility to perform the Work in accordance with the Contract Documents.
- D. Acceptance Criteria for Concrete Strength: The strength level of an individual class of concrete shall be considered satisfactory if both the following requirements are met:
1. The average of all sets of three consecutive strength tests equal or exceed the required $f'c$.
 2. No individual strength test falls below the required $f'c$ by more than 500 psi.
- A strength test shall be defined as the average strength of two cylinder breaks tested at the strength age indicated on the drawings for that class of concrete.
- E. Responsibility for Selection and Use of Concrete Admixtures and Chemical Treatments: The Contractor shall be responsible for selecting admixtures and surface treatments that are compatible with the intended use of the concrete including all final surface treatments called for within this or other specifications or on the structural or architectural drawings. The Contractor is responsible for following the manufacturer's instructions for the use of their product including abiding by any limitations placed by the manufacturer on the use of any of its products.
- F. Survey for Anchor Rods and Reinforcing Steel Dowels: The Contractor shall use a qualified, licensed professional engineer/land surveyor to lay out the proper location of all embedded anchor rods and reinforcing steel dowels for columns above before they are encased in concrete. The surveyed locations of such elements shall be submitted to the Architect/Engineer for record.

1.5 PREINSTALLATION CONFERENCES

- A. Mix Design Conference: At least 30 days prior to submittal of concrete design mixes, the Contractor shall hold a meeting or telephone conference to review the detailed requirements for preparing the concrete mix designs. Participants shall include representatives from the Contractor, Owner's Testing Laboratory, Concrete Supplier, and Engineer.
- B. Pre-Concrete Conference:
1. At least 7 days prior to beginning concrete work, the Contractor shall conduct a meeting to review the proposed mix designs and to discuss required methods and procedures to produce concrete construction of the required quality. Also review requirements for submittals, status of coordinating work and availability of materials. Establish work progress schedule and procedures for materials inspection, testing and certifications. The contractor shall send a pre-concrete conference agenda to all attendees 7 days prior to the scheduled date of the conference.
 2. The Contractor shall require responsible representatives of every party who is concerned with the concrete work to attend the conference, including but not limited to the following:

Contractor's Superintendent
Laboratory responsible for the concrete design mix
Laboratory responsible for field quality control
Concrete Subcontractor
Ready-Mix Concrete Producer
Owner's and Architect's/Engineer's Representative
 3. Minutes of the meeting shall be recorded, typed and printed by the Contractor and distributed by him to all parties concerned within 5 days of the meeting. One copy of the minutes shall be transmitted to the following for information purposes:

Owner's Representative
Architect
Engineer-of-Record
 4. The Engineer shall be present at the conference. The Contractor shall notify the Engineer at least 7 days prior to the scheduled date of the conference.

1.6 ACTION SUBMITTALS

- A. General: Submit the following in accordance with the Contract Provisions:
1. Product Data: Submit product data for proprietary materials and items, including reinforcement, forming accessories, admixtures, patching

- compounds, waterstops, joint systems, curing compounds, vapor retarders and others as requested by the Architect.
2. Include descriptive data, catalog cuts, laboratory test reports, and any other information necessary to show acceptable materials and confirm Contract compliance.
 3. Annotate data to show specific products to be used.
- B. Coordination Drawings: Submit original coordination drawings that identify the type and location of embeds, penetrations or other provisions required to execute the work of structural, architectural, plumbing, electrical or other trades. These items shall be located both by plan dimension and proposed elevation. Do not proceed with shop drawings for reinforcement or formwork until the coordination drawings have been approved.
- C. Shop Drawings for Reinforcement: Submit original shop drawings for fabrication, bending, and placement of concrete reinforcement. Include special reinforcement required for openings through concrete structures.
1. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures".
 2. Show bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of concrete reinforcement.
- D. Shop Drawings for Formwork: Submit shop drawings for fabrication and erection of forms for specific finished concrete surfaces. Show form construction including jointing, special form joints or reveals, location and pattern of form tie placement, and other items that visually affect exposed concrete.
1. Submit complete and accurate shop drawings as required to adequately illustrate and control the finished work. Show all dimensions, kind, type, and quality of all materials, applicable specification references, and all other information as may be necessary to detail finished construction of the work covered. Reproductions of the Contract Drawings are not acceptable as shop drawings.
 2. Shop drawings shall show walls in elevation and cross-section. Shop drawings shall show clear cover over reinforcing bars and interface with all columns, walls and beam/slab reinforcement.
 3. Shop drawings shall show locations of all embedded items.
 4. Submit details indicating contraction joints and joint sealers.
 5. Indicate materials utilized for sealing formwork joints and as a form release agent for coordination of subsequent coverings.
- E. Setting Drawings: Provide setting drawings and templates showing the location of all anchorage items that are to be cast into concrete.

- F. Concrete Mix Design Data: Not less than four weeks prior to beginning the work submit concrete mix design data to the Architect for review and approval. Mix designs shall be calculated and certified by the testing laboratory, and shall indicate the weight of each ingredient of the mixture, aggregate gradation, slump, air content, water-cement ratio and 7 day and 28-day compressive strength test results. Include a complete list of materials including admixtures and applicable reference specifications.
- G. Test and Inspection Reports: Provide reports as necessary to ensure that the tests and inspections specified have been executed.

1.7 INFORMATIONAL SUBMITTALS

- A. Certificates of Compliance: Submit manufacturer's certificates of compliance for the following materials showing that the named material conforms to the requirements of the Contract Documents. The manufacturer's certifications shall name the appropriate materials, the publication or publications specified as controlling the quality of that item, and shall state that the item conforms to the requirements specified. Certificates shall be printed on the manufacturer's letterhead and shall be signed by the manufacturer's official authorized to sign certificate of compliance, and having legal authority to bind the manufacturer. Furnishing certificates of compliance shall not provide relief of responsibility for providing materials that conform to the requirements of the Contract Documents.
 - 1. Aggregates.
 - 2. Admixtures.
 - 3. Reinforcement
 - 4. Cement.

1.8 PROVISION FOR OTHER WORK

- A. Provide for installation of inserts, hangers, metal ties, anchors, bolts, angle guards, dowels, thimbles, slots, nailing strips, blocking, grounds and other fastening devices required for attachment of work. Properly locate in cooperation with other trades and secure in position before concrete is poured. Do not install sleeves in any concrete slabs, beams or columns except where shown on the drawings or upon written approval of the Architect/Engineer.
- B. Protect adjacent finish materials against damage and spatter during concrete placement.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver packaged materials to Project Site in original unopened and undamaged containers plainly labeled with manufacturer's name, product name and designation, expiration period for use, mixing instructions for multi-component materials, and other pertinent data. Store and handle materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, breakage, and other causes.

- B. Product handling shall comply with the applicable requirements of ACI 301, Chapter 2, Paragraph 2.5. Reinforcing bars and accessories shall be stored above the ground on platforms, skids, or other supports. Other materials shall be stored in such a manner as to avoid contamination and deterioration.
- C. Damaged or non-conforming materials shall be removed from the Project site and replaced with new materials satisfactory to the Architect at no additional cost to the Owner.

1.10 ENVIRONMENTAL CONDITIONS

- A. Hot Weather Concreting: Comply with ACI 305R.
- B. Inclement Weather: Under conditions of rain, the placing of concrete shall not commence unless adequate protection is provided to prevent damage to the surface mortar or damaging flow or wash of the concrete surface. During inclement weather conditions concrete shall be provided with adequate protection to prevent damage.

1.11 PROJECT CONDITIONS

- A. Protection Against Spatter: Protect adjacent work, construction, and materials against spatter during concrete placement.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

Refer to the drawings for classes and strengths of concrete required.

- A. Portland Cement: ASTM C 150, Type I or Type III, or ASTM C 1157, Type GU or HE unless otherwise approved by the Architect/Engineer. For concrete exposed to salt air or salt water, provide Type II or Type V cement.

Use one brand of cement, for each class of concrete, throughout the project, unless approved otherwise by the Architect/Engineer and the Owner's Testing Laboratory. Submit mill certificates certifying conformance to this specification for each brand and type of cement.

- B. Low-alkali cement: Cement that has the additional requirement that equivalent alkalies ($\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$) do not exceed 0.60% according to ASTM C150-00, Table 2.
- C. Expansive Cement: ASTM C 845, Type G or K.
- D. Fly Ash: ASTM C 618, Class C or F.
- E. Silica Fume: ASTM C1240, Amorphous Silica.

- F. Ground Granulated Blast-Furnace Slag Cement: ASTM C989, Grade 100 or 120 or ASTM C 595, Type IS or Type S.
- G. Normal Weight Aggregates: ASTM C33, and as herein specified. Submit material certificates certifying conformance to this specification for each source of aggregate.
 - 1. If required by the provisions of this specification in the section entitled "Proportioning and Design of Concrete Mixes", submit certification that aggregate does not contain any deleterious materials that react with alkalis in the concrete mix to cause excessive expansion of the concrete for concrete that is exposed to wetting, has extended exposure to humid atmosphere, or is in contact with moist ground. This includes the following locations in this project:
- H. Lightweight Aggregates: ASTM C330. Submit material certificates certifying conformance to this specification for each source of aggregate.
- I. Water: Comply with the requirements of ASTM C94. Comply with the following chemical concentration limits in the total volume of mixing water whether or not wash water is used as part of the total mixing water.
 - 1. Chloride (Cl) as tested by ASTM D512
 - a. In prestressed concrete or in concrete for parking deck slabs: 500 ppm.
 - b. All other concrete: 1000 ppm
 - 2. Sulfates (SO₄) as tested by ASTM D516: 3000 ppm.
 - 3. Alkalies (Na₂O + 0.658 K₂O) in concrete placed as floor slabs or in concrete exposed to weather or humidity: 600 ppm.
 - 4. Total Solids as tested by AASHTO T26: 50,000 ppm.
- J. Air-Entraining Admixture: ASTM C260.

Subject to compliance with requirements, provide one of the following products and manufacturers:

- 1. W.R. Grace & Co.; Darex or Daravair series.
- 2. BASF Admixtures, Inc.; MB-VR, MB-AE90, or Micro-Air.
- 3. Sika Corporation; Sika AER.
- 4. The Euclid Chemical Company; Air Mix or AEA-92.
- 5. The Euclid Chemical Company; Eucon Air 30 or Eucon Air 40.

Submit manufacturer's certification that product conforms to the requirements specified and is compatible with all other admixtures to be used.

- K. Water-Reducing Admixture: ASTM C494, Type A. See maximum permissible chloride ion content in concrete specified below.

Subject to compliance with requirements, provide one of the following products and manufacturers:

1. BASF Construction Chemicals; Pozzolith series or Glenium 7000.
2. Sika Chemical Corp.; Plastocrete 161.
3. The Euclid Chemical Company; Eucon WR-75 or WR-91.
4. W.R. Grace & Co.; WRDA series.
5. The Euclid Chemical Company; Eucon NW or Eucon LW.

Submit manufacturer's certification that product conforms to the requirements specified and is compatible with all other admixtures to be used.

- L. Mid-Range Water-Reducing Admixture: ASTM C494, Type A and Type F. See maximum permissible chloride ion content in concrete specified below.

Subject to compliance with requirements, provide one of the following products and manufacturers:

1. "BASF Construction Chemicals; Polyheed series or Glenium 7000.
2. The Euclid Chemical Company; Eucon MR.
3. Sika Chemical Corp.; Sikament HP.
4. W.R. Grace & Co.; Daracem or Mira series.
5. The Euclid Chemical Company; Eucon X-15 or Eucon X-20.

Submit manufacturer's certification that product conforms to the requirements specified and is compatible with all other admixtures to be used.

- M. High-Range Water-Reducing Admixture (Super Plasticizer): ASTM C494, Type F or Type G. See maximum permissible chloride ion content in concrete specified below.

Subject to compliance with requirements, provide one of the following products and manufacturers:

1. W.R. Grace & Co.; ADVA or Daracem Series.
2. BASF Construction Chemicals; Rheobuild 1000 or Glenium series.

3. Sika Chemical Corp.; Sikament.
4. The Euclid Chemical Company; Eucon 37/1037 or Plastol series.
5. The Euclid Chemical Company; Eucon SP or Eucon RD2.

Submit manufacturer's certification that product conforms to the requirements specified and is compatible with all other admixtures to be used.

- N. Water-Reducing, Accelerator Admixture (Non-Corrosive, Non-Chloride): ASTM C494, Type C or E. See maximum permissible chloride ion content in concrete specified below.

Subject to compliance with requirements, provide one of the following products and manufacturers:

1. W.R. Grace & Co.; Polarset, Gilco, Lubricon NCA, Daraset 400, or DCI.
2. BASF Admixtures, Inc.; Pozzutec 20+ or Pozzolith NC 534.
3. The Euclid Chemical Company; Accelguard 80/90, NCA, or AcN.
4. Sika Chemical Co.; Plastocrete 161FL.
5. The Euclid Chemical Company; Eucon AcN.

Submit manufacturer's certification that product conforms to the requirements specified and is compatible with all other admixtures to be used.

- O. Water-Reducing, Retarding Admixture: ASTM C 494, Type D. See maximum permissible chloride ion content in concrete specified below.

Subject to compliance with requirements, provide one of the following products and manufacturers:

1. W.R. Grace & Co.; Daratard series.
2. BASF Construction Chemicals; Pozzolith series or DELVO series.
3. Sika Chemical Co.; Plastiment.
4. The Euclid Chemical Company; Eucon Retarder series.

Submit manufacturer's certification that product conforms to the requirements specified and is compatible with all other admixtures to be used.

- P. Shrinkage Reducing Admixture: An admixture that reduces drying shrinkage by reducing the capillary tension of pore water.

Subject to compliance with requirements, provide one of the following products and manufacturers:

For Air-Entrained Concrete:

1. Grace Construction Products; Eclipse 4500.
2. The Euclid Chemical Company; Eucon SRA.

For Non Air-Entrained Concrete

1. Grace Construction Products; Eclipse Floor 200.
2. BASF Construction Chemicals; Tetraguard AS20.

Q. Viscosity Modifying Admixture: Used to enhance plastic concrete properties such as workability, pumpability, and stability for "Self-Consolidating Concrete".

1. BASF Building Systems; Rheomac VMA series.
2. The Euclid Chemical Company; Eucon SL or Viscrol.
3. Sika Chemical Co.; VisoCrete series.
4. W.R. Grace & Co.; VMAR series.

R. Corrosion Inhibitor: 30% calcium nitrite

Products: Subject to compliance with requirements, provide the following at dosage rates per manufacturer's recommendation:

1. "Eucon CIA", The Euclid Chemical Co.
2. "DCI", W.R. Grace & Co.
3. "Rheocrete CNI", Master Builders
4. "Armatec 2000", Sika Chemical Co.
5. "Boral BCN", Boral Material Technologies, Inc.

S. Corrosion Inhibitor: Amine-Ester type

Products: Subject to compliance with requirements, provide the following at dosage rates per manufacturer's recommendation:

" BASF Construction Chemicals; Rheocrete 222+.

T. Moisture Vapor Reduction Admixture: Acceptable products include:

1. Barrier One, Inc.; Barrier-1.
2. USC Technologies, Inc.; Aridus.

3. W.R. Grace & Co.; Eclipse Floor 200.
 4. Concre Systems; Concre Systems Admixture.
- U. Crystalline-Forming Waterproofing Admixture: A powder admixture capable of producing concrete that is water tight under hydrostatic pressure up to seven atmospheres when tested in accordance with Corps of Engineers test CRD-C48 and capable of sealing cracks up to 0.4mm.
- Products: Subject to compliance with requirements, provide the following at dosage rates per manufacturer's recommendation:
1. ICS/Penetron International/Ltd; Penetron Admix.
 2. Kryton International, Inc.; Krystol Internal Membrane (ESR-1515).
 3. Xypex Chemical Corporation; Xypex C series.
 4. BASF Construction Chemicals; Rheomac 300D.
- V. Calcium Chloride and Chloride Ion Content: Calcium chloride or admixtures containing more than 0.5% chloride ions by weight of the admixture are not permitted. For shrinkage compensating concrete, industrial slabs, concrete slabs on metal deck and concrete designated as Exposure Class S2 or S3 as noted on the drawings, admixtures must be completely free of chloride ions.
- W. Certification: Written conformance to all the above mentioned requirements and the chloride ion content of the admixture as tested by an accredited laboratory will be required from the admixture manufacturer at the time of mix design review by the Engineer.

2.2 RELATED MATERIALS

- A. Waterstops: Provide waterstops at all construction joints and other joints in all foundation walls below grade and where shown on the drawings. Size to suit joints. Provide flat, dumbbell type or centerbulb type.
1. Extruded "rope" form, between two protective papers, silicone treated for fast stripping. Bentonite type waterstops not permitted.
 2. In standard cross-section (as extruded) of approximately 1 square inch, 36 inch minimum supplied length.
 3. Primer: As recommended by waterstop manufacturer.
 4. Basis of Design:
Henry Company - "SF302 Synko-Flex Waterstop.
- B. Vapor Retarders

Provide vapor retarder cover chosen from products specified below over prepared base material where indicated.

1. Plastic Vapor Retarder: Provide a flexible, preformed sheet membrane conforming to ASTM E 1745 with the following properties:
 - a. Class A material.
 - b. Minimum of 15 mils thick.
 - c. Maximum water vapor permeance rating of 0.01 perms after mandatory conditioning as tested by ASTM E 96.
 - d. Manufacturer's recommended tape and mastic.
 - e. Acceptable products include the following:
Stego Industries, LLC; Stego Wrap Vapor Barrier (15 mil).
Epro; Ecoshield-E (15 mil).
Raven Industries; VAPORBLOCK 15 (15 mil). "Perminator (10 mil)",
W.R. Meadows
 2. Bituminous Vapor Retarders: Provide a pre-molded membrane consisting of reinforced core and carrier sheet with fortified bitumen layers, protective weather coating, and plastic anti-stick sheet conforming to ASTM E 1993 with the following properties:
 - a. Maximum water vapor permeance rating of 0.002 perms after mandatory conditioning as tested by ASTM E 96.
 - b. Manufacturer's recommended tape and mastic.
 - c. Acceptable products include the following:
W.R. Meadows; Premoulded Membrane Vapor Seal with Plasmatic Core.
 3. Tape for Plastic Moisture Retarders: High-density polyethylene tape with pressure sensitive adhesive having a minimum width of 3.75" having a maximum water vapor transmission rate of 0.3 perms.
- C. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
- D. Moisture-Retaining Cover: One of the following, complying with ANSI/ASTM C 171:
1. Waterproof paper.
 2. Polyethylene film.
 3. Polyethylene-coated burlap.
- E. Slip-resistive Emery Aggregate or Aluminum Granule Finish: Provide fused aluminum-oxide granules, or crushed emery, as abrasive aggregate for slip-resistive finish. The emery aggregate shall contain not less than 50% aluminum oxide and not less than 20% ferric oxide. The aluminum aggregate material shall contain not less than 95% fused aluminum-oxide granules. Use material that is

factory-graded, packaged, rust-proof and non-glazing, and is unaffected by freezing, moisture and cleaning materials.

Subject to compliance with requirements, provide one of the following:

"Emery Non-Slip", Dayton-Superior
"Grip-It", L&M Construction Chemicals, Inc
"Grip-It AO", L&M Construction Chemicals, Inc
"Frictex NS", Sonneborn-ChemRex

- F. Colored, Mineral Aggregate, Dry Shake Surface Hardener: Packaged, dry, combination of materials, consisting of portland cement, graded quartz aggregate, coloring pigments (if required) and plasticizing admixtures. Use coloring pigments that are finely ground, non-fading mineral oxides, interground with cement. Color, as selected by Architect, unless otherwise indicated.

Products: Subject to compliance with requirements, provide one of the following:

"Surflex"; Euclid Chemical Co.
"Quartz Plate"; L & M Const. Chemical Co.
"Mastercron"; Chem-Rex, Inc., MBT Protection and Repair Division
"Harcot", Sonneborn-Chem-Rex
"Quartz-Tuff", Dayton Superior
"US Spec Dense Top", US Mix Co.

Submit manufacturer's certification that product conforms to the requirements specified.

- G. Metallic Aggregate Hardener Finish: Packaged dry, combination of materials consisting of Portland Cement, specially processed and graded iron aggregate, coloring pigments (if required) and plasticizing admixtures. The hardener shall be formulated, processed and packaged under stringent quality control. Use coloring pigments that are finely ground, nonfading mineral oxides interground with cement. Color as selected by Architect unless otherwise indicated.

"Euco-Plate HD"; The Euclid Chemical Company, Inc.
"Masterplate 200"; ChemRex, Inc., MBT Protection and Repair Division
"Ferro Tuff," Dayton-Superior

- H. Non-Oxidizing Metallic Floor Hardener: Packaged dry, combination of materials consisting of Portland Cement, non-rusting aggregate and plasticizing admixtures.

"Diamond Plate," Euclid Chemical Company
"Lumiplate," ChemRex, Inc., MBT Protection and Repair Division

- I. Liquid Membrane-Forming Curing and Curing and Sealing Compounds:

1. High-Solids, Solvent-Based Curing and Sealing Compound with Moderate Yellowing Characteristics: Liquid type membrane-forming curing and sealing compound, clear styrene acrylate type, complying with ASTM

C1315, Type I, Class B, 28% solids content minimum. Moisture loss shall be not more than 0.32 Kg/m² in 72 hours when applied at 300 sq. ft./gal. Do not apply to surfaces that are to receive subsequent cementitious toppings, sealers, hardeners, ceramic tile, resilient flooring, vinyl-backed carpet, wood, terrazzo, epoxy overlays or adhesives, or other coating or finishing products. Subject to compliance with requirements, provide one of the following products:

"Kure-N-Seal 30," Sonneborn Chem-Rex
"Super Rez-Seal," Euclid Chemical Co.
"Masterkure N-Seal-HS," ChemRex, Inc., MBT Protection and Repair Division
"Dress & Seal 30", L & M Construction Chemicals, Inc.

Submit manufacturers certification that product conforms to the requirements specified and is compatible with all subsequent surface treatments. Submit any instructions that must be followed prior to any subsequent surface treatments.

2. High-Solids, Solvent-Based, Non-Yellowing Curing and Sealing Compound: Liquid type membrane-forming curing compound, acrylic type, complying with ASTM C1315, Type 1, Class A. Do not apply to surfaces that are to receive subsequent cementitious toppings, sealers, hardeners, ceramic tile, resilient flooring, vinyl-backed carpet, wood, terrazzo, epoxy overlays or adhesives, or other coating or finishing products.

Products: Subject to compliance with requirements, provide the following product or equivalent products:

"Lumiseal Plus"; L.M. Construction Chemicals
"Super Diamond Clear"; Euclid Chemical Co.
"Solvent Seal 30", Unitex
"Vocomp 25", W.R. Meadows
"US Spec CS-30-1315", US Mix Co.

Submit manufacturers certification that product conforms to the requirements specified and is compatible with all subsequent surface treatments. Submit any instructions that must be followed prior to any subsequent surface treatments.

3. Water-Based Dissipating Resin Type Curing Compound: Curing Compound shall be a dissipating resin type, which chemically breaks down after approximately 4 weeks. Membrane forming compound shall meet ASTM C309, Types 1 and 1D Class B.

Products: Subject to compliance with requirements, provide one of the following:

"Kurez DRVox", Euclid Chemical Company
"L&M Cure R", L&M Construction Chemicals

“Hydro Cure 309”, Unitex
“Sealtight 1100-Clear”, W. R. Meadows
“US Spec Maxcure Resin Clear”, US Mix Co.

Submit manufacturer's certification that product conforms to the requirements specified and is compatible with any covering or surface treatments to be applied. Submit any instructions that must be followed prior to any subsequent surface treatments and floor coverings.

4. High Solids, Water-Based Acrylic Curing and Sealing Compound with Moderate Yellowing Characteristics: Water-Based membrane-forming curing and sealing compound conforming to ASTM C 1315, Type 1, Class B, classified as low odor. Product shall provide a maximum moisture loss of 0.030 Kg/m² in 72 hours when applied at a coverage rate of 300 sf/gallon. Do not apply to surfaces that are to receive subsequent cementitious toppings, sealers, hardeners, ceramic tile, resilient flooring, vinyl-backed carpet, wood, or terrazzo, epoxy overlays or adhesives, or other coating or finishing products.

Products: Subject to compliance with above requirements, provide one of the following products or equivalent products:

"Safe Cure and Seal (J-19)"; Dayton Superior Corp.
"Super Aqua-Cure VOX"; Euclid Chemical Co.
"Dress & Seal, 30 WB"; L & M Construction Chemicals, Inc.
"Masterkure 200W"; ChemRex, Inc., MBT Protection and Repair
Division

Submit manufacturer's certification that product conforms to the requirements specified and is compatible with any covering or surface treatments to be applied. Submit any instructions that must be followed prior to any subsequent surface treatments.

5. High Solids, Water-Based, Non-Yellowing Curing and Sealing Compound: Water based membrane-forming curing and sealing compound, acrylic type, complying with ASTM C1315, Type 1, Class A classified as low odor. Do not apply to surfaces that are to receive subsequent cementitious toppings, sealers, hardeners, ceramic tile resilient flooring, vinyl-backed carpet, wood, terrazzo, epoxy overlays or adhesives, or other coating or finishing products.

Products: Subject to compliance with requirements, provide one of the following:

"Super Diamond Clear Vox", Euclid Chemical Company
"Lumiseal 30 WB", L&M Construction Chemicals
"Kure 1315", Sonneborn-ChemRex
"Hydro Seal 30", Unitex
"Vocomp 30", W. R. Meadows
"US Spec Radiance UV-25", US Mix Co.

Submit manufacturer's certification that product conforms to the requirements specified and is compatible with any covering or surface treatments to be applied. Submit any instructions that must be followed prior to any subsequent surface treatments.

- J. Chemical Curing/Floor Hardener Compound: Sodium silicate based compound which reacts with concrete constituents to harden the surface, resulting in a surface having a maximum abrasion coefficient of 0.25 cm³/cm² when tested in accordance with ASTM C 418.

Products: Subject to compliance with requirements, provide one of the following:

"Eucosil," Euclid Chemical Co.
"Sonosil," Sonneborn-ChemRex
"Day-Chem S.1-Cure (J-13), Dayton Superior
"Chem Hard;" L & M Construction Co.
"Uni Cure HD", Unitex
"Med-Cure", W. R. Meadows
"US Spec Permasil", US Mix Co.

Submit manufacturer's certification that product conforms to the requirements specified and is compatible with all coverings and surface treatments to be applied. Submit any instructions that must be followed prior to any subsequent surface treatments.

- K. Evaporation Control: Monomolecular film forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss in hot weather conditions.

Products: Subject to compliance with requirements, provide one of the following:

"Eucobar"; Euclid Chemical Company
"E-Con"; L & M Construction Chemical, Inc.
"Confilm"; ChemRex, Inc., MBT Protection and Repair Division
"Sure Film (J-74)", Dayton Superior
"SikaFilm", Sika Chemical Co.
"Pro-Film", Unitex
"Sealtight Evapre", W. R. Meadows
"US Spec Monofilm ER", US Mix Co.

Submit manufacturer's certification that product conforms to the requirements specified and is compatible with all coverings and surface treatments to be applied. Submit any instructions that must be followed prior to any subsequent surface treatments.

- L. Chemical Hardener: Colorless aqueous solution containing a blend of magnesium fluosilicate and zinc fluosilicate combined with a wetting agent, containing not less than 2 lbs. of fluosilicates per gal.

Products: Subject to compliance with requirements, provide one of the following:

"Surfhard"; Euclid Chemical Co.
"Lapidolith"; Sonneborn-Chem-Rex
"Day-Chem Hardener (J-15)," Dayton Superior
"Fluohard", L & M Construction Chemical, Inc.
"Penalith", W. R. Meadows

Submit manufacturer's certification that product conforms to the requirements specified and is compatible with all coverings or surface treatments to be received. Submit any instructions that must be followed prior to any subsequent surface treatments.

- M. Water and Chloride Ion Repelling Penetrating Sealer: Clear, solvent based Silane or Siloxane penetrating sealer which reacts chemically with the concrete surface to function as a Chloride Ion screen with a minimum 90% factor when tested in accordance with NCHRP #244 and applied in accordance with the manufacturer's recommendation.

Products: Subject to compliance with requirements, provide one of the following:

"Euco-Guard 100 or 200", Euclid Chemical Co.
"Masterseal SL 40%", ChemRex, Inc., MBT Protection and Repair Division
"Penetrating Sealer 40-VOC", Sonneborn-ChemRex

- N. Water and Chloride Ion Repelling Penetrating Sealer: Clear, water based Silane or Siloxane penetrating sealer which reacts chemically with the concrete surface to function as a Chloride Ion screen with a minimum 83% factor when tested in accordance with NCHRP #244, Series II and applied in accordance with the manufacturer's recommendation.

Products: Subject to compliance with requirements, provide one of the following:

"Euco-Guard Vox", Euclid Chemical Co.
"Sikaguard 701W", Sika Chemical Co.
"Aquapel or Aquapel Plus" L&M Construction Chemicals"
"Enviroseal 20" Hydrozo - Chemrex

- O. Bonding Compound: Polyvinyl acetate or acrylic base, for use in cosmetic and/or nonstructural repairs.

Products: Subject to compliance with requirements, provide one of the following:

1. Acrylic or Styrene Butadiene:

"Day-Chem Ad Bond (J-40)"; Dayton Superior
"SBR Latex"; Euclid Chemical Co.
"Daraweld C"; W. R. Grace
"Acrylic Additive," Sonneborn Chem-Rex, Inc.
"SikaLatex", Sika Chemical Co.

"Intralok", W. R. Meadows
"US Spec Acrylcoat", US Mix Co.

2. Polyvinyl Acetate (Interior Use Only)

"Euco Weld"; Euclid Chemical Co.
"Everweld"; L & M Construction Chemicals, Inc.
"Superior Concrete Bonder (J-41)," Dayton Superior
"US Spec Bondcoat", US Mix Co.

P. Epoxy Products: Two component material suitable for use on dry or damp surface, complying with ASTM C 881, for use in all structural concrete repairs.

1. Products for Crack Repair:

"Sikadur 35 Hi Mod LV"; Sika Chemical Company – injection type
"Sikadur 52", Sika Chemical Company – injection type
"Sikadur 55 SLV", Sika Chemical Company – gravity feed
"Eucopoxy Injection Resin," Euclid Chemical Company
"Sure-Inject (J-56)," Dayton Superior
"Epofil SLV", Sonneborn-ChemRex
"ETI-LV" or "ETI-GV", Simpson Strong-Tie Co., Inc. – injection type
"Pro-Poxy 100 LV" or "Pro-Poxy 50", Unitex
"Crackbond", U.S. Anchor Corp.
"Rezi-Weld LV", W. R. Meadows
"US Spec Maxibond" US Mix Co. – injection or gravity feed
"US Spec Eposeal LVS", US Mix Co. – gravity feed

2. Products for Epoxy Mortar Patches:

"Sikadur Lo-Mod LV"; Sika Chemical Corporation
"Euco 352 LV," Euclid Chemical Company
"Sure Grip Epoxy Grout (J-54)," Dayton-Superior
"Epofil", Sonneborn-ChemRex
"Pro-Poxy 2500", Unitex
"Rezi-Weld 1000", W. R. Meadows
"US Spec EPM 3000", US Mix Co.

3. Products for Epoxying Bolts or Reinforcing Steel into Concrete-Moderate Temperatures: Product that conforms to ASTM C881-02, Type IV, Grade 3, Class B, & C except gel times, and that is dispensed from a two-component cartridge system through a mixing nozzle that thoroughly mixes the two components as it is injected into the hole. . Do not install these products when the surface temperature of the concrete substrate is less than 40° F.

"Sikadur 31 Hi-Mod Gel"; Sika Corporation
"Euclid 452 Gel", Euclid Chemical Company
"Sure Anchor I (J-51)", Dayton Superior
"Epo Gel" or "Rapid Gel", Soneborn Chem-Rex

"Power-Fast Injection Gel", Powers Rawl
"Epoxy-Tie ET" or "Epoxy-Tie SET", Simpson Strong-Tie Co., Inc.
"Pro-Poxy 300", Unitex
"Ultrabond 1300", U.S. Anchor Corp.
"Rezi-Weld 1000", W. R. Meadows
"US Spec Gelbond NS", US Mix Co.

4. Products for Epoxying Bolts or Reinforcing Steel into Concrete-Low or Moderate Temperatures: Product that conforms to ASTM C881-02, Type IV, Grade 3, Class A, B, & C except gel times, and that is dispensed from a two-component cartridge system through a mixing nozzle that thoroughly mixes the two components as it is injected into the hole. Consult with the manufacturer for the minimum temperature of the concrete surface allowed.

"HSE 2421 System", or "HIT RE 500", Hilti Fastening Systems
"Econ C6 System", ITW Ramset/Red Head
"Euclid 620 Gel", Euclid Chemical Company
"Pro-Poxy 300 Fast", Unitex
"HS-200", U.S. Anchor Corp.
"US Spec Gelbond NS Fast", US Mix Co.

5. Products for Epoxying Steel Plates to Concrete: Conform to ASTM C881-90, Type IV, Grade 3, Class A, B, & C except gel times.

"Sikadur 31 Hi-Mod Gel"; Sika Corporation
"Euclid 452 Gel," Euclid Chemical Company
"Sure Anchor I (J-S1)," Dayton Superior
"Epo Gel" or "Rapid Gel", Soneborn Chem-Rex
"Pro-Poxy 200", Unitex
"US Spec Gelbond NS" US Mix Co.

Substitutions may be considered provided complete technical information and job references are furnished to the Engineer for approval prior to commencement of work.

- Q. Self-Leveling Mortars, Underlayment Compound: Freeflowing, self-leveling, pumpable cementitious base compound.

Products: Unless specified otherwise, provide one of the following:

"Sonoflow," Sonneborn Chem-Rex, Inc.
"Sikatop 111"; Sika Chemical Co.
"Flo-Top" or "Flo-Top 90"; Euclid Chemical Co.
"Levelayer I," Dayton Superior
"US Spec Self-leveling Underlayment" US Mix Co.

- R. Polymer Patching Mortar: Polymer and microsilica modified cementitious based compounds.

Products:

Horizontal Application

"Thin Top Supreme, Concrete Top Supreme," Euclid Chemical
"Sikatop 121 or 122," Sika Chemical
"Emaco R310CI," ChemRex, Inc., MBT Protection and Repair Division
"Sonopatch 100 or 300", Sonneborn-ChemRex
"US Spec H2 or NuTop" US Mix Co.

Vertical or Overhead Application

"Verticoat/Verticoat Supreme," Euclid Chemical
"Sikatop 123," Sika Chemical
"Emaco R320CI," ChemRex, Inc., MBT Protection and Repair Division
"Sonopatch 200", Sonneborn-ChemRex
"US Spec V/O Patch", US Mix Co.

- S. High Strength Flowing Repair Mortar: For forming and pouring structural members, or large horizontal repairs, provide flowable one-part, high strength microsilica polymer modified repair mortar with 3/8" aggregate. The product shall achieve 9000 psi @ 28-days at a 9-inch slump.

Products:

"Road Patch", Sonneborn-ChemRex
"US Spec STR Mortar", US Mix Co.

- T. Anti-Corrosive Epoxy/Cementitious Adhesive: Water-based epoxy/cementitious compound for adhesion and corrosion protection or reinforcing members (20 hour maximum open time).

Products:

"Corr-Bond," Euclid Chemical Co.
"Armatec 110," Sika Chemical Co.
"Sonoprep", Sonneborn-ChemRex

- U. Expansion Anchors in Concrete:

1. ICC Approval: Only anchors evaluated by the ICC Evaluation Service, Inc. (ICC-ES) with a published Evaluation Report shall be approved for use. Anchors that are to be installed in concrete that may become cracked under service loads as noted on the drawings shall be evaluated by ICC-ES according to Acceptance Criteria 193 and shall be specifically approved for use in cracked concrete. All anchors shall be approved for resisting seismic and wind loads.
2. Type: All expansion anchors in concrete shall be only wedge type expansion, sleeve-type expansion, or undercut type anchors.

3. Interior Use: All expansion anchors, nuts and washers for use in interior conditioned environments free of potential moisture shall be manufactured from carbon steel zinc plated in accordance with Federal Specification QQ-Z-325C, Type II, Class 3.
4. Exterior or Exposed Use: All expansion anchors, nuts and washers for use in exposed or potentially wet environments, or for attachment of exterior cladding materials shall be galvanized or stainless steel. Galvanized anchors, nuts and washers shall conform to ASTM A 153. Stainless steel anchors shall be manufactured from 300 series stainless steel and nuts and washers from 300 series or Type 18-8 stainless steel.
5. Nuts and Washers: Nuts and washers shall be furnished from the manufacturer and used with the anchors.
6. Acceptable Products and Manufacturers – Cracked and Uncracked Concrete:

“Kwik Bolt TZ”, “HDA Undercut Anchor” and “HSL-3 Heavy Duty Sleeve Anchor”, Hilti Fastening Systems

Other products will be acceptable only if evaluated by ICC-ES according to Acceptance Criteria 193 with a published Evaluation Report that specifically allows the use of the anchor in cracked concrete.

V. Screw Anchors in Concrete

1. Approvals: Only anchors evaluated by the ICC Evaluation Service, Inc. (ICC-ES) with a published Evaluation Report shall be approved for use. Screw Anchors are not approved for use in cracked concrete.
2. Interior Use: All screw anchors for use in interior conditioned environments free of potential moisture shall be manufactured from carbon steel zinc plated in accordance with Federal Specification QQ-Z-325C, Type II, Class 3.
3. Exterior or Exposed Use: All screw anchors for use in exposed or potentially wet environments, or for attachment of exterior cladding materials shall be galvanized or stainless steel. Galvanized anchors shall conform to ASTM A 153. Stainless steel anchors shall be manufactured from 300 series stainless steel.
4. Acceptable Products and Manufacturers – Uncracked Concrete Only:

“HUS-H Screw Anchor”, Hilti Fastening Systems
“Titen HD”, Simpson Strong-Tie Co., Inc.
“Large Diameter Tapcon (LDT)”, 3/8” and 1/2” diameters, ITW Ramset/Redhead

W. Chemical Anchoring of Bolts and Reinforcing Steel in Concrete- Sealed Capsule Type:

1. Type: Product shall consist of a sealed glass capsule containing a two part system of modified vinylester resin and hardener. Adhesive anchors containing polyester resin shall not be used.
2. Acceptable Products: Subject to compliance with requirements, provide one of the following:

"HVA Adhesive System"; Hilti Fastening Systems.
"Chem-Stud", Powers Fasteners, Inc.
"Maxima 7", ITW Ramset/Red Head
"Ultrabond Glass Capsule", U.S. Anchor Corp.

Other manufacturers will be acceptable only if approved by ICBO with an ICBO Research Report submitted for Engineer review.

X. Chemical Anchoring of Bolts in Concrete – Acrylic, Methacrylate, or Epoxy Acrylate type Resin and Hardener:

1. Type: Product that conforms to ASTM C881-02, Type IV, Grade 3, Class A, B, & C except gel times and epoxy content and that shall consist of a two component adhesive system contained in side by side packs connected to a mixing nozzle which thoroughly mixes the components as it is injected into the hole. Consult with the manufacturer for the minimum temperature of the concrete surface allowed.
2. Products: Subject to compliance with requirements provide one of the following:

"Epcon A7", ITW Ramset/Red Head
"HIT HY-150/HIT-ICE", Hilti Fastening Systems
"Acrylic-Tie", Simpson Strong-Tie Co., Inc.
"Pro-Poxy 400", Unitex
"SpeedSet2", U.S. Anchor Corp.

Other manufacturers will be acceptable only if approved by ICBO with an ICBO Research Report submitted for Engineer review.

Y. Threaded Rods Chemically Anchored in Concrete

1. Type; Threaded rods installed in holes using a chemical anchoring process shall have a 45° chiseled end on one end.
2. Interior Application; Meet the requirements of ASTM A307, A36 or A193, grade B7.
3. Exterior Application: Meet the requirements of ASTM A153 galvanized steel, or F593, Group 1 or 2, condition CW stainless steel.

Z. Anchor Rods:

1. All anchor rods shall conform to ASTM F1554 unless noted otherwise on the drawings and shall be of the yield strength as specified below as appropriate for the types and at the locations as specified on the drawings:
 - a. ASTM F1554, Grade 36 (1/4 inch to 4 inches in diameter).
 - b. ASTM F1554, Grade 55 (1/4 inch to 4 inches in diameter). (Also comply with Supplementary Requirement S1 of ASTM F1554)
 - c. ASTM F1554, Grade 105 (1/4 inch to 3 inches in diameter).
 - d. ASTM A588 (corrosion resistant).
 - e. ASTM A354 Grade BD, 130 ksi (to 2 ½ inches in diameter).
 - f. ASTM A354 Grade BD, 115 ksi (greater than 2 ½ inches to 4 inches in diameter).
 - g. ASTM A354 Grade BC, 109 ksi (to 2 ½ inches in diameter).
 - h. ASTM A354 Grade BC, 99 ksi (greater than 2 ½ inches to 4 inches in diameter).
2. Anchor rods used with ASTM A588 baseplates shall be threaded round stock conforming to ASTM A588, grade 50.
3. Anchor rods used with galvanized baseplates shall be galvanized.
4. Nuts: All nuts with anchor rods shall be heavy hex head conforming to ASTM A563.
5. Washers: Washers for all base plates shall be 1/4" thick plates extending minimum 1" from edge of base plate holes on each side with holes 1/16 inch larger than the nominal bolt diameter. Washers shall conform to ASTM A36 steel.

AA. Non-Shrink Grout:

1. Type: Grout for base plates, bearing plates and grouting under precast or tilt-up wall panels shall be a non-metallic, shrinkage resistant, premixed, non-corrosive, non-staining product containing Portland cement, silica sands, shrinkage compensating agents and fluidity improving compounds.
2. Specifications: Non-shrink grout shall conform to ASTM C1107.
3. Compressive Strength: Provide the minimum strength as shown below as determined by grout cube tests at 28 days:
 - a. 6,000 PSI for supporting concrete 3000 psi and less.
 - b. 8,000 PSI for supporting concrete greater than 3000 psi and less than or equal to 4000 psi.
 - c. Unless noted otherwise on the drawings, grout strength on supporting concrete greater than 4000 psi shall be 8000 psi.
4. Products: Acceptable non-shrink grouts are listed below:

"Crystex"; L & M Construction Chemicals, Inc.
"Masterflow 713"; Master Builders
"Set Grout," ChemRex, Inc.
"Five Star Grout"; U. S. Grout Corp.
"SonogROUT 10K"; Sonneborn-Chem-Rex
"NS Grout"; Euclid Chemical Co.
"Sure-Grip High Performance Grout"; Dayton Superior Corp.
"CG 200 PC", Hilti, Inc.
CG-86 Grout", W. R. Meadows
"US Spec GP Grout", US Mix Co.

5. High Flow, Non-Metallic Grout: Use high-flow grout where high fluidity and/or increased placing time is required and for base plates that are larger than 10 square feet. The factory pre-mixed grout shall conform to ASTM C1107, "Standard Specification for Packages Dry, Hydraulic-Cement Grout (Non-Shrink)." In addition, the grout manufacturer shall furnish test data from an independent laboratory indicating that the grout when placed at a fluid consistency shall achieve 95% bearing under a 18" x 36" base plate. Provide one of the following:

"Hi-Flow Grout," The Euclid Chemical Co.
"Masterflow 928," ChemRex, Inc.
"14K Hy Flow," Sonneborn Chem-Rex
"588 Grout", W. R. Meadows
"US Spec MP Grout", US Mix Co.

BB. Frictionless Bearing Pads:

1. Types:

- a. Frictionless bearing pads shall be a nominal 3/32" glass filled virgin Tetrafluoroethylene (TFE) conforming to ASTM D4745 with a 10 gauge A36 steel backing plate factory bonded with a tested epoxy performed in a heated bonding process under a controlled pressure. Provide one sliding pad tack welded to the lower supporting surface and one tack welded to the upper surface. Unless detailed otherwise on the drawings, the upper element shall be larger than the lower element on all sides by the amount of the expansion joint width shown on the drawings.
- b. The lower frictionless bearing pads shall be a nominal 1/16" glass filled virgin Tetrafluoroethylene (TFE) conforming to ASTM D4745 with a 10 gauge A36 steel backing plate factory bonded with a tested epoxy performed in a heated bonding process under a controlled pressure. The upper frictionless bearing pad shall be a 20 gauge stainless steel sheet (RMS<20) resistance welded to a 10 gauge A36 steel backing plate. The lower sliding pad shall be tack welded to the lower supporting surface and the upper pad tack welded to the upper surface. Unless detailed otherwise on the drawings, the upper element shall be larger than the lower element

on all sides by the amount of the expansion joint width shown on the drawings.

2. Design: The pad size and design shall conform to 1998 AASHTO "LRFD Bridge Design Specifications," Section 14. Design bearing pressure under total service load shall not exceed the manufacturer's recommendation. If Neoprene is used the compressive load shall be limited to 800 psi.
3. Corrosion Resistance: Frictionless bearing pads for exterior or exposed usage shall be manufactured for use in an exposed climate of heat, cold, moisture, and ultraviolet rays. All backing steel in an exposed or open environment shall be shop painted with a zinc rich paint or field painted with "ZRC Cold Galvanizing Compound".
4. Acceptable Manufacturers: The following manufacturers are acceptable:
 - a. Con-Serv, Inc., Georgetown, SC
 - b. Seismic Energy Co., Athens, TX

Other manufacturers will be acceptable only with Engineer approval prior to bid.

- CC. Synthetic Fibrous Reinforcement: Collated, fibrillated, or monofilament polypropylene or multi-filament nylon fibers specifically manufactured for use in concrete complying with ASTM C1116, Section 4.1.3.

Products:

"Forta Ferro" or "Ultra-Net"; Forta Corp.
"Fibermesh InForce e3"; Synthetic Industries, Inc., Fibermesh Division
"Caprolan-RC", Honeywell Nylon Inc.
"Nycon RC", Nycon, Inc.

- DD. Reglets: Where resilient or elastomeric sheet flashing or bituminous membrane are terminated in reglets, provide reglets of not less than 26 gage galvanized sheet steel. Fill reglet or cover face opening to prevent intrusion of concrete or debris.
- EE. Carton Forms: Carton forms shall be manufactured using corrugated paper material with a moisture resistant exterior surface and specifically designed for foundation support. Carton forms shall be designed to support the wet weight of the concrete that is shown by the details to be poured on top of the form but not less than 600 psf. Refer to the Reinforced Concrete General Notes for the restriction on horizontal construction joints. The forms shall be designed in such a way that the bottom of the form will collapse when acted upon by upward movement of the soil.
1. Form Configuration: Carton forms shall be of a vertical cellular configuration only, except as permitted by item 4 below, and shall be rectangular as shown on the details. The depth of the carton forms is shown on the details. Forms shall be manufactured to fit snugly against round piers and shall be baffled in such a way as to prevent concrete from flowing

back into the form during the concrete pour. The Contractor shall use expandable foam to fill all gaps and holes between carton forms and at intersections with foundations.

2. Carton forms shall be kept dry and protected until concrete is poured. Wet, compressed, or deteriorated carton forms shall not be used. Do not wrap or cover carton forms with polyethylene sheets or permanent waterproof cover as that will prevent proper deterioration of the forms.
3. Technical data and brochures on carton forms shall be submitted for Engineer's review.
4. Other types of forms using different types of paper and different configurations will be accepted if it can be shown by independent tests that the form will properly function and will deteriorate due to moisture in an appropriate time frame.
5. For slab conditions, cover carton forms with a 1/4 inch masonite protection cover board to prevent puncture and other damage during construction.
6. Products: Subject to requirements, acceptable manufacturers include but are not limited to the following:

SureVoid Products, Inc., Englewood, CO

- FF. Contraction and Construction Joint-Filler Material for Slabs-on-Grade: Provide a 2-component semi-rigid, 100% solids epoxy having a minimum shore A hardness of 80 when tested in accordance with ASTM D2240. Subject to compliance with requirements, provide one of the following:

"Euco 700", Euclid Chemical Co., Inc.
"Spec-Joint CJ"; Conspec Marketing and Manufacturing Co., Inc.
"Masterfill 300 I", ChemRex, Inc., MBT Protection and Repair Division
"MM-80", Metzger/McGuire Co.
"Rezi-Weld Flex", W. R. Meadows
"US Spec SR-50 EJF", US Mix Co.

- GG. Bondbreaker for Construction Joints in Slabs-on-Grade: A dissipating bondbreaking compound containing no silicones, resins, or waxes, and that conforms to ASTM C309. Subject to compliance with requirements, acceptable manufacturers include the following:

"Sure-Lift", Dayton Superior Corporation, Inc.
"Tilt-Eez", Conspec Marketing and Manufacturing Co., Inc.

- HH. Joint-Filler Strips for Isolation Joints in Slabs-on-Grade: ASTM D1751, asphalt-saturated cellulosic fiber, or ASTM D1752, cork or self-expanding cork

- II. Rigid-Cellular-Polystyrene Boards use as Fill under Topping Slabs or Slabs-on-Grade: Provide rigid, cellular polystyrene boards that conform to ASTM C 6817,

Type EPS12EPS15EPS22EPS29 Subject to compliance with requirements, acceptable manufacturers include the following:

“STYROFOAM Brand Square Edge” (XPS 26) Dow Chemical Company
“R-Control EPS Geofom” - All grades, R-Control Building Systems
“EPS Geofom”, Carpenter Co.
“Knauf Geofom”, Knauf Polystyrene
“Insulfill”, Premier Industries

2.3 PROPORTIONING AND DESIGN OF CONCRETE MIXES

- A. The Contractor shall submit for approval by the Engineer and Owner's Testing Laboratory, at least 15 working days prior to the start of construction, concrete mix designs and the Concrete Mix Design Submittal Form located at the end of this specification section for each class of concrete indicated on the structural drawings and in the Specifications. The Contractor shall not begin work with a particular mix until that mix design has been approved.
- B. Mix Design Conference: At least 30 days prior to submittal of concrete design mixes, the Contractor shall hold a meeting or telephone conference to review the detailed requirements for preparing the concrete mix designs. Participants shall include representatives from the Contractor, Owner's Testing Laboratory, Concrete Supplier, and Engineer.
- C. The Contractor, acting in conjunction with his Concrete Supplier and his Testing Laboratory, shall submit in writing, with his mix designs, the method used to select mix proportions. Either of the following methods, as outlined in ACI 318, may be used.
1. Field Experience Method
 2. Laboratory Trial Mixture Method
- When field experience methods are used to select concrete proportions, establish proportions as specified in ACI 301 and ACI 211. When Laboratory trial batches are used to select concrete proportions, the procedure as outlined in ACI 318 shall be followed. Prepare test specimens in accordance with ASTM C192 and conduct strength tests in accordance with ASTM C39. Proportioning without field experience or trial mixtures is not permitted.
- D. Required types of concrete and compressive strengths shall be as indicated on the Structural Drawings.
- E. All mix designs shall state the following information:
1. Mix design number or code designation by which the Contractor shall order the concrete from the Supplier.
 2. Structural member for which the concrete is designed (i.e., columns, shear walls, footings, etc.).

3. Wet and dry unit weight.
 4. 28 day compressive strength.
 5. Aggregate type, source, size, gradation, fineness modulus.
 6. Cement type and brand.
 7. Fly ash or other pozzolan type and brand (if any).
 8. Admixtures including air entrainment, water reducers, accelerators, and retarders.
 9. Design Slump.
 10. Proportions of each material used.
 11. Water cement ratio and maximum allowable water content.
 12. Method by which the concrete is intended to be placed (bucket, chute, or pump).
 13. Required average strength qualification calculations per ACI 318 5.3.1 and 5.3.2. Submit separate qualification calculations for each production facility that will supply concrete to the project.
 14. Documentation of Average strength (trial mix data or field test data) per ACI 318 5.3.3. When field test data is used to qualify average strength, submit separate documentation for each production facility that will supply concrete to the project.
 15. Field test data submitted for qualification of average strength under ACI 318 5.3.1, 5.3.2 and 5.3.3 shall include copies of the Concrete Testing Agency's reports from which the data was compiled.
 16. All other information requested in the Concrete Mix Design Submittal Form located at the end of this specification section.
- F. Concrete Suppliers Record of Quality Control: The concrete supplier's past record of quality control shall be used in the design of the concrete mixes to determine the amount by which the average concrete strength f_{CR} should exceed the specified strength $f'c$ as outlined in ACI 318. If a suitable record of test results is not available, the average strength must exceed the design strength by the amount as specified in ACI 318. After sufficient data becomes available from the job, the statistical methods of ACI 214 may be used to reduce the amount by which the average strength must exceed $f'c$ as outlined in ACI 318.
- G. Low Alkali Concrete: The total alkali contribution from cementitious materials in the concrete mix shall not exceed 4.0 pounds per cubic yd of concrete unless the aggregate used is certified to contain no deleterious materials that react with alkalis

in the concrete mix as defined in ASTM C33. This requirement may be met by the use of low-alkali cement.

- H. Fly Ash: Fly ash replacement of cement shall not exceed 25% unless otherwise approved. Approval for higher levels will be based on showing experience of satisfactory performance on other projects using materials from identical sources as proposed for this project. Submit evidence of such experience on other projects.
- I. Aggregate: Provide aggregates from a single source for exposed concrete. For exterior exposed surfaces, do not use fine or coarse aggregates containing spalling-causing deleterious substances. Combined aggregate gradation for slabs and other designated concrete shall be 8% - 18% for large top size aggregates (1 1/2 in.) or 8% - 22% for smaller top size aggregates (1 in. or 3/4 in.) retained on each sieve below the top size and above the No. 100.
- J. Admixtures:
 - 1. Admixtures to be used in concrete shall be subject to the approval of the Engineer and Owner's Testing Laboratory.
 - 2. Quantities of admixtures to be used shall be in strict accordance with the manufacturers instructions.
- K. Lightweight Structural Concrete:
 - 1. Comply with the requirements of ACI 211 and ACI 301.
 - 2. Provide concrete with a dry unit weight of not more than 116 pounds per cubic foot and not less than 110 pounds per cubic foot. Design mix to produce strengths as indicated on the drawings with a split cylinder strength factor $(f_{ct}/(f'c)^{0.5})$ of not less than 5.7.
- L. Adjustments of Concrete Mixes: Mix design adjustments may be requested by the Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant. Such mix design adjustments shall be provided at no additional cost to the Owner. Any adjustments in approved mix designs including changes in admixtures shall be submitted in writing with the specified Concrete Mix Design Submittal Form to the Engineer and Owner's Testing Laboratory for approval prior to field use.
- M. Shrinkage: All concrete shall be proportioned for a maximum allowable unit shrinkage of 0.03% measured at 28 days after curing in lime water as determined by ASTM C157 (using air storage).
- N. Chloride Ion Content: A written submittal shall be made with each mix design proposed for use on the project that the chloride ion content from all ingredients including admixtures will not exceed the limits specified in this section of the Specifications.

2.4 CONCRETE MIXES

- A. Ready-Mix Concrete: Comply with requirements of ANSI/ASTM C 94, "Ready Mixed Concrete" and Testing Laboratory section of the specifications.

PART 3 - EXECUTION

3.1 SLUMP LIMIT

- A. The slump, as measured in the field where concrete cylinders are taken, shall be within plus or minus 1 inch of the design slump noted on the Mix Design Submittal Form. Water may be added to the concrete in the field only to the extent that the prescribed water-cement ratio noted in the Mix Design Submittal Form is not exceeded.

3.2 MOISTURE RETARDER INSTALLATION

- A. Install moisture retarder in accordance with ASTM E 1643 and manufacturer's instructions.
- B. Seal all joints in the field with the specified pressure sensitive tape. Heat-welded joints fabricated in a shop prior to delivery is an acceptable method to minimize the number of field joints.
- C. Seal all pipe penetrations through the moisture retarder with a boot made from the moisture retarder material and tape.

3.3 JOINTS IN CONCRETE

- A. Construction Joints: Locate and install construction joints as indicated on the drawings or if not shown on drawings, located so as not to impair strength and appearance of the structure, as acceptable to Architect/Engineer.
 - 1. Keyways: Provide keyways with a depth of one tenth of the member thickness (1 1/2" minimum or as shown on the drawings) in construction joints only where shown on the drawings.
 - 2. Joint Construction: Place construction joints in the center one third of suspended spans and grade beams and as shown on the drawings for slabs-on-grade and walls unless shown otherwise. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise shown on the drawings. Dowels that cross construction joints shall be supported during concreting operations so as to remain parallel with the slab or wall surface and at right angles to the joint. Submit all construction joint locations as a shop drawing submittal.
 - 3. Waterstops: Provide waterstops in construction joints as indicated on the Architectural and Structural Drawings. Install waterstops to form

continuous diaphragm in each joint. Make provisions to support and protect exposed waterstops during progress of work. Fabricate field joints in waterstops in accordance with manufacturer's printed instructions.

4. Isolation Joints in Slabs-on-Ground: Construct isolation joints (without dowels) in slabs-on-ground at points of contact between slabs on ground and vertical surfaces only where specifically detailed on the drawings. Install joint-filler strips at joints where indicated. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated on the drawings. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together. Provide construction joints with dowels at all locations unless isolation joints are detailed.
5. Contraction (Control) Joints in Slabs-on-Ground: Maximum joint spacing shall be 36 times the slab thickness or 20 feet, whichever is less and at a minimum on column lines unless otherwise noted on the drawings. Use one of the two following methods (sawed or formed) to create the joints.
 - a. Sawed Joints
 - (1) Primary Method: Early-Entry, dry-cut method, by Soff-Cut International, Corona, CA (800) 776-3328. Finisher must have documented successful experience in the use of this method prior to this project. Install cuts within 1 to 4 hours after final finish as soon as the concrete surface is firm enough to not be torn or damaged by the blade at each saw cut location. Use 1/8 inch thick blade, cutting 1 1/4" inch into the slab.
 - (2) Optional Method (where Soff-Cut System method equipment is not available): Use a conventional saw to cut joints within 4 to 12 hours after finishing as soon as the concrete has hardened sufficiently to prevent aggregates from being dislodged by the saw. Complete cutting before shrinkage stresses become sufficient to produce cracking. Use 1/8 inch thick blade, cutting to a depth of 1/4 of the slab thickness but not less than 1 inch.
 - b. Formed Joints: Form contraction joints by inserting premolded plastic hardboard or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. The depth is to be 1/4 the slab thickness, but not less than 1 inch. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.
 - c. Joint Filler: Provide in both contraction and saw-cut construction joints when specified.
 - (1) Remove dirt and debris from the joint by vacuuming immediately prior to filling joint. Clean the joint of curing compounds and sealers.
 - (2) Filler material shall be applied to the joints when the building is under permanent temperature control, but no less than 90 days after slab construction.

- (3) Strictly following the manufacturer's recommended procedure for installing filler material.
- d. The Contractor shall protect the joints from damage caused by wheeled traffic or other sources during construction until a joint-filler material (if specified) has been installed.

3.4 INSTALLATION OF EMBEDDED ITEMS

- A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto unless directed otherwise by these specifications. Install reglets to receive top edge of foundation sheet waterproofing where specified by the Architect, and to receive thru-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, relieving angles and other conditions.
- B. Anchor Rods: Furnish anchor rods and other connectors required for securing structural steel to foundations and other in-place work as shown on the drawings. Furnish 1/8" minimum steel templates for presetting bolts and other anchors to accurate locations as shown on the drawings.
- C. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.
- D. Do not install sleeves in concrete slabs, pier caps, footings or walls except where shown on the structural drawings or approved by the Architect and Engineer.
- E. Securely fasten embedded plates, angles, anchor rods and other items to be built into the concrete to the formwork or hold in place with templates. Insertion of these items into concrete after casting is prohibited.

3.5 CONCRETE PLACEMENT

- A. Preplacement Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used.
- B. Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel.
- C. Comply with ACI 301 and as herein specified.
 1. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to

cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation. Spread concrete using short-handled, square-ended shovels, or come-alongs.

2. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
3. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping. Use internal vibrators of the largest size and power that can properly be used in the work as described in the table entitled "Range of characteristics, performance, and applications of internal vibrators" found in ACI 301.
4. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6" into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.
5. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed. Place concrete for beams, girders, brackets, column capitals, haunches, and drop panels at the same time as concrete for slabs. Do not place concrete over columns and walls until concrete in columns and walls is no longer plastic and has been in place at least one hour.
6. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners of forms, eliminating air and stone pockets that may cause honeycombing, pitting, or planes of weakness.
7. Bring slab surfaces to correct level with straightedge and strikeoff. Use highway straightedges, bull floats or darbies to smooth surface free of humps or hollows before excess moisture or bleedwater appears on the surface. Do not disturb slab surfaces prior to beginning finishing operations.
8. Maintain reinforcing in proper position during concrete placement operations.
9. Placing Concrete by Pump: If concrete is placed by using a pump, the grout used for pump priming must not become a part of the completed structure

unless an engineered grout design mix and grout location are approved in advance by the Engineer.

3.6 FINISH OF FORMED SURFACES

- A. Rough Form Finish: Provide rough form finish for formed concrete surfaces not exposed-to-view in the finish work and in parking garages unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.
- B. Smooth Form Finish: Provide smooth form finish for formed concrete surfaces exposed-to-view (except parking garage, unless noted otherwise), or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, painting, veneer plaster or other similar system or to a surface that is to receive a smooth rubbed finish or grout cleaned finish. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections exceeding 1/8 inch in height removed and smoothed.
- C. Smooth Rubbed Finish: Provide smooth rubbed finish to scheduled or specified concrete surfaces, which have received smooth-form finish treatment, not later than one day after form removal. Moisten concrete surfaces and rub with carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.
- D. Grout Cleaned Finish: Provide grout cleaned finish to scheduled or specified concrete surfaces that have received smooth-form finish treatment.
 - 1. Combine one part portland cement to 1-1/2 parts fine sand by volume, and 50:50 mixture of acrylic or styrene butadiene based bonding admixture and water to consistency of thick paint. Proprietary additives may be used at Contractor's option. Blend standard portland cement and white portland cement, amounts determined by trial patches, so that final color of dry grout will closely match adjacent surfaces.
 - 2. Thoroughly wet concrete surfaces and apply grout to coat surfaces and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.
- E. Related Unformed Surfaces: At tops of walls, horizontal offsets and similar unformed surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.7 MONOLITHIC SLAB FINISHES

Place, consolidate, strike off, and level concrete, eliminating high spots and low spots, before proceeding with any other finish operation. Do not add water to the surface of the concrete during finishing operation.

- A. Scratch Finish: Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo and other bonded applied cementitious finish flooring material, and as otherwise indicated. After placing slabs, plane surface to tolerance specified below. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set, with stiff brushes, brooms or rakes.
- B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo, and as otherwise indicated. After screeding, consolidating and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using a hand float, a bladed power float equipped with float shoes, or a powered disk float, when the bleed water sheen has disappeared and the concrete surface has stiffened sufficiently to permit the operation. Check and level surface plane to a tolerance as specified below. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.
- C. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint or other thin film finish coating system. After floating, begin first trowel finish operation by hand or power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with a level surface to a tolerance as specified below. Grind smooth surface defects which would telegraph through applied floor covering system.
- D. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply trowel finish as specified above, then immediately follow with slightly scarifying surface by fine brooming.
- E. Slip-Resistive Broom Finish: Apply slip-resistive broom finish to garage floors and ramps less than 6% slope, exterior concrete platforms, steps and ramps and elsewhere as indicated. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.
- F. Rake Finish: Provide a rake (groove) finish to all ramps exceeding a 6% slope. Finish shall be applied at a 45-degree angle to direction of traffic flow in accordance with the pattern shown on the structural drawings. Extend the rake finish as least 12 feet beyond the beginning and ending of the greater-than-6% ramp. A rake finish shall be made with a flat wire texture broom having flat wire tines that are

three-quarters (3/4) inch center to center by four (4) inches long by one-eighth (1/8) inch wide producing a uniform rough groove surface for maximum traction.

- G. Chemical-Hardener Finish: Apply chemical-hardener finish to interior concrete floors where indicated. Apply liquid chemical-hardener after complete curing and drying of the concrete surface. Apply proprietary chemical hardeners, in strict accordance with manufacturer's printed instructions.

After final coat of chemical-hardener solution is applied and dried, remove surplus hardener by scrubbing and mopping with water.

- H. Penetrating Sealer Finish: Apply a chloride-and-water-repelling-penetrating-sealer finish to surfaces as described below and where indicated on the drawings. Apply liquid penetrating sealer after complete curing and drying of the concrete surface. Apply proprietary sealers in strict accordance with manufacturer's printed instructions. The Contractor shall verify the compatibility of the sealer product with the paint used to stripe parking decks and coordinate the sequencing of the sealing and striping operations. Apply to the following surfaces:

1. Sloping and horizontal surfaces of parking garages
2. Top surfaces of exposed exterior balconies

- I. Slip-Resistive Aggregate Finish: Apply slip-resistive aggregate finish to concrete stair treads, platforms, ramps and elsewhere as indicated on the Architect's or Structural Drawings.

After completion of float finishing, and before starting trowel finish, uniformly spread 25 lbs. of dampened slip-resistive aggregate per 100 sq. ft. of surface. Tamp aggregate flush with surface using a steel trowel, but do not force below surface. After broadcasting and tamping, apply trowel finishing as herein specified.

After curing, lightly work surface with a steel wire brush, or an abrasive stone, and water to expose slip-resistive aggregate.

- J. Colored, Mineral Aggregate Surface Hardener: Provide colored, mineral aggregate surface hardener to monolithic slab surface indicated.

Apply dry shake materials for colored wear-resistant finish at rate of not less than 100 lbs. per 100 sq. ft., unless greater amount is recommended by material manufacturer.

Cast a trial slab approximately 20 feet square to determine actual application rate, color and finish as acceptable to Architect/Engineer.

Immediately following first floating operation, uniformly distribute approximately 2/3 of required weight of dry shake material over concrete surface, and embed by means of power floating. Follow floating operation with second shake application, uniformly distributing remainder of dry shake material at right angles to first application, and embed by power floating.

After completion of broadcasting and floating, apply trowel finish as herein specified. Cure slab surface with curing compound recommended by dry shake hardener manufacturer. Apply curing compound immediately after final finishing.

- K. Non-Oxidizing Metallic Floor Hardener: Slabs in areas noted on the drawings shall receive an application of the non-oxidizing, metallic floor hardener applied at the rate of 150 lbs. Per 100 sq. ft. Immediately following the first floating operation, uniformly distribute approximately 2/3 of the required weight of the hardener over the concrete surface by mechanical spreader and embedded by means of power floating. The hardener shall be floated in and the second application made. The surface shall be floated again to properly bond the hardener to the base concrete slab. The surface shall then be troweled at least twice to a smooth dense finish.
- L. Metallic Aggregate Floor Hardener: Slabs in areas noted on the drawings shall receive an application of the metallic aggregate floor hardener applied at the rate of 150 lbs. Per 100 sq. ft. Immediately following the first floating operation, uniformly distribute approximately 2/3 of the required weight of the hardener over the concrete surface by mechanical spreader and embedded by means of power floating. The hardener shall be floated in and the second application made. The surface shall be floated again to properly bond the hardener to the base concrete slab. The surface shall then be troweled at least twice to a smooth dense finish.
- M. Finish of Top of Spread Footings and/or Mat Foundations:
1. Top Surface below Finished Slab: The top of the footing or mat shall be screeded level and smooth with a flatness F-number, $F_F 15$ (overall), $F_F 10$ (minimum local) and a levelness F-number, $F_L 12$ (overall), $F_L 10$ (minimum local).
 2. Top Surface as Finished Slab: The top surface of a footing or mat that is to serve as the finished slab in the building shall be leveled, cured, and surface prepared as specified for the finished floor construction appropriate to the space usage as defined in the Architectural Drawings.

3.8 CONCRETE FINISH MEASUREMENT AND TOLERANCES

A. Definitions:

1. Flatness - a measure of a concrete surfaces curvature or deviation from a planar surface. Concrete surfaces that are not flat are wavy or bumpy.
2. Levelness - A measure of a concrete surfaces tilt or inclination from a horizontal plane. Concrete surfaces that are not level are sloped or tilted.
3. F_F Flatness F-Number - The flatness F-Number F_F measures floor curvature or flatness and for any floor section or overall floor area is defined as follows:

$$F_F = \frac{4.57}{(3 \times S_q) + \bar{q}}$$

Where \bar{q} is the mean value and S_q the standard deviation of all floor q readings. A q reading is defined as the difference in slope between three successive points along any test measurement line on the floor surface that are twelve inches apart.

4. F_L Levelness F-Number - The levelness F-Number F_L measures floor inclination from a horizontal plane and for any floor section or overall area is defined as follows:

$$F_L = \frac{12.5}{(3 \times S_z) + \bar{z}}$$

Where \bar{z} is the mean value and S_z the standard deviation of all floor z readings. A z reading is defined as the difference in elevation between two successive points along any test measurement line on the floor surface that are 10 feet (120") apart.

Measurement of F_L is not applicable for floors that are intentionally inclined or cambered, for elevated structural floors that can deflect from the time the floor is poured to the time it is measured, and for unshored form surfaces.

- B. Tolerance on Floor Elevations: Construction tolerance on absolute floor elevation from the specified elevation as shown on the drawings shall be as specified below, taken from ACI 117:

1. Slab-on-Grade Construction - $\pm 3/4"$.
2. Top surfaces of formed slabs measured prior to removal of supporting shores - $\pm 3/4"$.
3. Top surfaces of all other slabs - $\pm 3/4"$.

The tolerance on relative elevation difference between points on the floor shall be defined by the F_L Levelness F-Number as prescribed below.

- C. Construction Requirements to Achieve Specified Floor Finish Tolerances:

1. Forms shall be properly leveled, in good condition and securely anchored including special attention to ends and transitions.
2. Bearing surfaces for straightedges such as form edges or previously poured slabs shall be kept clean of laitance, sand, gravel, or other foreign elements.

3. Screeds shall be maintained in good condition with true round rolling wheels and level cutting edges. The use of optical sighting equipment such as lasers is recommended for checking levelness and straightness. The Contractor shall promptly adjust or replace equipment when test results indicate substandard work.
 4. Highway straightedges are recommended for use in lieu of bullfloats for all slab placement and finishing operations.
- D. Contractor Responsibility for Concrete Floor Finish Requirements: Floor finish requirements shown below (flatness and levelness tolerances) are minimum requirements that apply unless stricter requirements are contained in instructions for installation of applied floor products in which case the Contractor is responsible for attaining the values prescribed by the manufacturer of such products.
- E. Concrete Floor Finish Tolerance for Slab-on-Grade Construction:
1. Concrete Placement: Concrete shall be placed and screeded to predetermined marks set to elevations prescribed on the drawings.
 2. Tolerance:
 - a. Slabs in nonpublic areas, mechanical rooms, surfaces to received raised computer flooring, surfaces to have thick-set tile or a topping, and parking structures:
Specified Overall Value - F_F20/F_L15
Minimum Local Value - F_F15/F_L10
 - b. Carpeted Areas:
Specified Overall Value - F_F25/F_L20
Minimum Local Value - F_F17/F_L15
 - c. Exposed slabs in public spaces, slabs to receive thin-set flooring:
Specified Overall Value - F_F35/F_L25
Minimum Local Value - F_F24/F_L17
 - d. Ice or Roller rinks:
Specified Overall Value – F_F45/F_L30
Minimum Local Value – F_F30/F_L24
 - e. Movie or Television studios
Specified Overall Value – F_F50/F_L50
Minimum Local Value – F_F40/F_L40
 - f. Gymnasium Floors Scheduled to Receive Wood Playing Floor
Specified Overall Value – F_F50/ F_L50
Minimum Local Value - F_F40/ F_L40
- F. Concrete Floor Finish Tolerance for Shored, Cast-in-Place Suspended Slab Construction:

1. Concrete Placement: Formwork shall be set and securely braced so that soffits are positioned to allow scheduled concrete member sizes and thicknesses within tolerances specified in ACI 117. Concrete shall be placed and screeded to predetermined marks on the form surface conforming to elevations prescribed on the drawings.
2. Camber: Formwork camber, as indicated on the drawings, shall be set to provide a uniform, smooth soffit profile in each direction. Minimum slab thickness, as specified on the drawings, shall be maintained throughout the slab surface to a tolerance as specified in ACI 117. Tolerance on camber shall be $\pm 1/4"$. Levelness F-Number tolerances specified below do not apply to areas of the floor where camber or intentional slope is shown.
3. Tolerance:
 - a. Slabs in nonpublic areas, mechanical rooms, surfaces to received raised computer flooring, surfaces to have thick-set tile or a topping, and parking structures:
Specified Overall Value - F_F20/F_L15
Minimum Local Value - F_F15/F_L10
 - b. Carpeted Areas:
Specified Overall Value - F_F25/F_L20
Minimum Local Value - F_F17/F_L15
 - c. Exposed slabs in public spaces, slabs to receive thin-set flooring:
Specified Overall Value - F_F30/F_L20
Minimum Local Value - F_F24/F_L15
 - d. Movie or Television studios
Specified Overall Value - F_F50/F_L50
Minimum Local Value - F_F40/F_L40

Slabs specified to slope shall have a tolerance from the specified slope of $3/8"$ in 10 feet at any point as required by ACI 117.

Levelness values (F_L) stated above apply only to areas of the floor where the floor is specified to be level (uncambered and no intentional slope).

4. Extra Concrete: The contractor shall include in his bid any additional concrete required to achieve the specified slab surface finish tolerance.
5. Concrete Placement at Column Bays Supported by Unshored Transfer Girders: Concrete in floor areas supported by transfer girders or trusses shall be placed and screeded to predetermined marks placed over the metal deck slab conforming to elevations as specified on the drawings. At least the minimum slab thickness, as specified on the drawings, shall be maintained throughout the slab surface. The Contractor shall conform to the F_F values specified above.

G. Concrete Floor Finish Tolerance - Unshored Metal Deck on Shored or Unshored Steel Beam or Open-Web Joist Floor Construction:

1. Concrete Placement: Concrete over metal deck shall be placed and screeded level and flat to the tolerance specified below, maintaining at least the minimum slab thickness at all locations as specified on the drawings. The Contractor shall increase the slab thickness as required to compensate for metal deck deflection, and in unshored beam construction, residual beam camber and beam deflection in order to achieve a level and flat floor within specified tolerances.
2. Tolerance:
 - a. Slabs in nonpublic areas, mechanical rooms, surfaces to received raised computer flooring, surfaces to have thick-set tile or a topping, and parking structures:
Specified Overall Value - F_F20
Minimum Local Value - F_F15
 - b. Carpeted Areas:
Specified Overall Value - F_F25
Minimum Local Value - F_F17
 - c. Exposed slabs in public spaces, slabs to receive thin-set flooring:
Specified Overall Value - F_F30
Minimum Local Value - F_F24
 - d. Movie or Television studios
Specified Overall Value – F_F50
Minimum Local Value – F_F40

Eighty percent (80%) of the final floor surface shall fall within an envelope of 0.75" centered about the mean elevation of all the readings. (± 0.375 about mean). The mean elevation of all readings shall not deviate from the specified design grade by more than ± 0.375 ".

Slabs specified to slope shall have a tolerance from the specified slope of 3/8" in 10 feet at any point as required by ACI 117.

3. Extra Concrete: The contractor shall include in his bid any additional concrete required to achieve the specified slab surface finish tolerance and to compensate for metal deck deflection, beam camber and beam deflection.
4. Concrete Placement at Column Bays Supported on Transfer Girders or Trusses: Concrete in floor areas supported by transfer girders or trusses shall be placed and screeded to predetermined marks placed over the metal deck slab conforming to elevations as specified on the drawings. At least the minimum slab thickness, as specified on the drawings, shall be maintained throughout the slab surface. The Contractor shall conform to the F_F values specified above.

H. Remedial Measures for Slab Finish Construction Not Meeting Specified Tolerances:

1. Application of Remedial Measures. Remedial measures specified herein are required whenever either or both of the following occur:
 - a. The composite overall values of F_F or F_L of the entire floor installation measure less than specified values.
 - b. Any individual test section measures less than the specified absolute minimum F_F or F_L value.
2. Modification of Existing Surface:
 - a. If, in the opinion of the Architect/Engineer or Owner's Representative, all or any portion of the substandard work can be repaired without sacrifice to the appearance or serviceability of the area, then the Contractor shall immediately undertake the approved repair method.
 - b. The Contractor shall submit for review and approval a detailed work plan of the proposed repair showing areas to be repaired, method of repair and time to effect the repair.
 - c. Repair method(s), at the sole discretion of the Architect/Engineer or Owner's Representative, may include grinding (floor stoning), planing, retopping with self leveling underlayment compound or repair topping, or any combination of the above.
 - d. The Architect/Engineer or Owner's Representative maintains the right to require a test repair section using the approved method of repair for review and approval to demonstrate a satisfactory end product. If, in the opinion of the Architect/Engineer or Owner's Representative, the repair is not satisfactory an alternate method of repair shall be submitted or the defective area shall be replaced.
 - e. The judgment of the Architect/Engineer or Owner's Representative on the appropriateness of a repair method and its ability to achieve the desired end product shall be final.
 - f. All repair work shall be performed at no additional cost to the Owner and with no extension to the construction schedule.
3. Removal and Replacement:
 - a. If, in the opinion of the Architect/Engineer or Owner's Representative, all or any portion of the substandard work cannot be satisfactorily repaired without sacrifice to the appearance or serviceability of the area, then the Contractor shall immediately commence to remove and replace the defective work.
 - b. Replacement section boundaries shall be made to coincide with the test section boundaries as previously defined.
 - c. Sections requiring replacement shall be removed by sawcutting along the section boundary lines to provide a neat clean joint between new replacement floor and existing floor.

- d. The new section shall be reinforced the same as the removed section and doweled into the existing floor as required by the Engineer. No existing removed reinforcing steel may be used. All reinforcing steel shall be new steel.
- e. Replacement sections may be retested for compliance at the discretion of the Architect/Engineer or Owner's Representative.
- f. The judgment of the Architect/Engineer or Owner's Representative on the need for replacement shall be final.
- g. All replacement work shall be performed at no additional cost to the Owner and with no extension to the construction schedule.

3.9 CONCRETE CURING AND PROTECTION

A. General:

1. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Maintain concrete with minimal moisture loss at a relatively constant temperature for the period necessary for hydration of the cement and hardening of concrete. In hot, dry and windy weather protect concrete from rapid moisture loss exceeding 0.2 lb./sq. ft. x hr before and during finishing operations with an evaporation control material. Apply in accordance with manufacturer's instructions after screeding and bull floating, but before power floating and troweling.
2. Curing shall commence as soon as free water has disappeared from the concrete surface after placing and finishing. The curing period shall be 7 days for all concrete except high early strength concrete which shall be cured for 3 days minimum.

Alternatively, curing times may be reduced if either of the following provisions is complied with:

- a. If tests are made of cylinders kept adjacent to the structure and cured by the same methods, curing measures may be terminated when the average compressive strength has reached 70% of the specified 28 day compressive strength.
 - b. If the temperature of the concrete is maintained at a minimum of 50°F for the same length of time required for laboratory cured cylinders of the same concrete to reach 85% of the 28 day compressive strength, then curing may be terminated thereafter.
3. Curing shall be in accordance with ACI 301 procedures. Avoid rapid drying at the end of the curing period.

- #### B. Curing Formed Surfaces:
- Where wooden forms are used, cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. When forms are removed, continue curing by one or a combination of the methods specified below, as applicable.

1. Columns and Shearwalls Not Exposed to View: Moist cure in forms or by one or a combination of methods 1, 2, or 3 specified below. Use a high – solids, liquid membrane-forming curing and sealing compound conforming to ASTM C1315, type I, Class A or B for method 3.
 2. Columns and Shearwalls Exposed to View: Moist cure in forms or by one or a combination of methods 1, 2 or 3 specified below. Use a high-solids, non-yellowing, liquid membrane-forming curing and sealing compound conforming to ASTM C1315, type 1, class A for method 3.
 3. Sides and Soffits of Beams and Pan-Joist Ribs, Soffits of Slabs: Moist cure in forms or by one or a combination of methods 1, 2 or 3 specified below. Use a liquid membrane-forming dissipating resin curing compound conforming to ASTM C309, type 1, class A or B for method 3.
 4. Basement Walls, Sides of Exterior Retaining Walls: Moist cure in forms or by one or a combination of methods 1, 2 or 3 specified below. Use a liquid membrane-forming dissipating resin curing compound conforming to ASTM C309, type 1, class A or B for method 3.
- C. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping and other flat surfaces by one or a combination of the methods specified below, as applicable. The Contractor shall choose a curing method that is compatible with the requirements for subsequent material usage on the concrete surface.
1. Ramps and Horizontal Surfaces of Parking Areas, Exposed Exterior Balconies: Cure using only methods 1 or 2 as specified below.
 2. Floors Directly Exposed to Vehicular or Foot Traffic not in Parking Areas and not otherwise receiving a chemical hardener finish: Apply two coats of a high-solids, liquid membrane-forming curing and sealing compound conforming to ASTM C1315, type 1, Class A in accordance with method 3 as specified below.
 3. Floors in Non-Public spaces that are left exposed to view and not receiving sealers or hardeners, floors involved in under-floor air distribution systems: Apply one coat of a high-solids, water-based liquid membrane-forming curing and sealing compound conforming to ASTM C1315, type 1, Class A or B in accordance with method 3 as specified below.
 4. Floors that are to receive subsequent cementitious toppings, sealers, hardeners, ceramic tile, acrylic terrazzo, vinyl composition tile, sheet vinyl, linoleum, vinyl-backed carpet, rubber, athletic flooring, synthetic turf, wood, epoxy overlay or adhesive, or other coating or finishing products: Cure using methods 2 or 3 as specified below. Use a water-based dissipating resin type curing compound conforming to ASTM C309, type 1, class A or B for method 3.

5. All Other Surfaces: Cure using methods 1,2 or 3 as specified below. Use a water-based dissipating resin type curing compound conforming to ASTM C309, type 1, class A or B for method 3.

D. Curing Methods:

1. Method 1 - Moisture Curing: Provide moisture curing by one of the following methods:
 - a. Keep concrete surface continuously wet by covering with water.
 - b. Continuous water-fog spray.
 - c. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.

2. Method 2 - Moisture-Cover Curing: Provide moisture-cover curing as follows:

Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape. Water may be added to concrete surface to prevent drying before the cover is installed, but the surface shall not be flooded with water.

3. Method 3 – Curing or Curing and Sealing Compound: Provide curing, curing/hardener, liquid membrane-forming curing, or curing and sealing compound as follows:

Apply specified compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Do not allow to puddle. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period. Apply second coat for sealing 2 to 3 hours after the first coat was applied.

Do not use membrane-forming curing and sealing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, dampproofing, membrane roofing, flooring (such as ceramic or quarry tile, glued-down carpet, vinyl composition tile, linoleum, sheet vinyl, rubber, athletic flooring, synthetic turf, or wood), paint or other coatings and finish materials. Dissipating resin type cures are acceptable in these locations.

3.10 HOT OR OTHER ADVERSE WEATHER CONCRETING

A. Definition:

1. Conditions warranting hot weather concreting practices are defined as any combination of high air temperature, low relative humidity and wind velocity tending to impair the quality of fresh or hardened concrete or otherwise result in abnormal properties. If conditions cause an evaporation rate of 0.2 lb./sq. ft./hr. as calculated by Figure 2.1.5 in ACI 305R-99, then precautions shall be taken to prevent plastic shrinkage cracks from occurring.
 2. The maximum acceptable concrete temperature at the truck discharge point shall be 95°F.
- B. Specification: Hot weather concreting practices specified below shall be followed, all or in part as required, to limit the concrete temperature at the truck discharge point to 95°F or lower.
- C. Records: Under hot weather conditions, the Contractor shall keep records of outside air temperature, concrete temperature at truck discharge and general weather conditions.
- D. Hot Weather Concreting Requirements: The following items, all or in part as required, shall be followed to limit the concrete temperature to 95°F or lower and to minimize the possibility of plastic shrinkage cracks from developing.
1. Design the concrete mixes specifically for hot weather conditions replacing some cement with fly ash or other pozzolan and using a water reducing retarding admixture (ASTM C 494 Type D).
 2. Use the largest size and amount of coarse aggregate compatible with the job.
 3. Use sunshades and/or windbreaks.
 4. Delay construction of indoor slabs-on-grade until the walls and roof are constructed.
 5. Cool and shade aggregate stockpiles.
 6. Use ice as part of the mixing water or cool the water with liquid nitrogen.
 7. Limit the number of revolutions at mixing speed to 125 maximum.
 8. Reduce time between mixing and placing as much as possible.
 9. Do not add water to ready-mixed concrete at the job site unless it is part of the amount required initially for the specified water-cement ratio and the specified slump.
 10. Schedule concrete placement for early morning, late afternoon, or night.
 11. Have all forms, equipment and workers ready to receive and handle concrete.

12. Maintain one standby vibrator for every three vibrators used.
13. Keep all equipment and material cool by spraying with water including exteriors of forms, reinforcing steel, subgrade, chutes, conveyors, pump lines, tremies, and buggies.
14. Protect slab concrete at all stages against undue evaporation by applying a fog spray or mist above the surface or applying a monomolecular film. Where high temperatures and/or placing conditions dictate, use water-reducing retarding admixture (Type D) in lieu of the water-reducing admixture (Type A) as directed by the Owner's Testing Laboratory.
15. Provide continuous curing, preferably with water, during the first 24 hours using wet burlap, cotton mats, continuous spray mist, or by applying a curing compound meeting ASTM C 1315. Continue curing for 3 days minimum.
16. Cover reinforcing steel with water soaked burlap so that steel temperature will not exceed ambient air temperature immediately before placement of concrete.
17. As soon as possible, loosen forms and run water down the inside. When forms are removed, provide a wet cover to newly exposed surfaces.

3.11 COLD OR OTHER ADVERSE WEATHER CONCRETING

A. Definition:

1. Concrete shall not be placed when the outside air temperature is 40°F or less unless cold weather concreting practices are followed as specified below.
2. Cold weather concreting practices should also be followed whenever the following conditions exist for more than three successive days:
 - a. the average daily air temperature is less than 40°F, and
 - b. the air temperature is not greater than 50°F for more than one half of any 24 hour period.

The average daily air temperature is the average of the highest and lowest temperature occurring during the period from midnight to midnight.

3. The temperature of concrete mixed and delivered to the job site shall conform to the following requirements:

| <u>Air Temperature</u> | <u>Min. Concrete Temperature</u> |
|------------------------|----------------------------------|
| Above 30°F | 60°F |
| 0°F to 30°F | 65°F |
| Below 0°F | 70°F |

4. The minimum temperature of concrete during placement and curing shall be 55°F.
 5. The maximum concrete temperature heated by artificial means at point of placement shall not exceed 90°F.
- B. Records: Under cold weather conditions, the Contractor shall keep records of outside air temperature, concrete temperature as placed and general weather conditions.
- C. Cold Weather Concreting Requirements: The following items, all or in part as required, should be followed to assure acceptable concrete in cold weather conditions:
1. Design the concrete mix suitable for cold weather. Use air entrainment (where not prohibited) and obtain high early strength by using a higher cement content, a high early strength cement (Type III), or a specified non-chloride accelerator (ASTM C 494 Type C or E).
 2. Protect the concrete during curing period using insulating blankets, insulated forms, enclosures and/or heaters.
 3. Concrete cured in heated enclosures shall have heaters vented to prevent exposure of concrete and workmen to noxious gases.
 4. Frozen subgrade shall be thawed prior to concrete placement and snow and ice shall be removed from forms.
 5. Concrete shall be protected and cured at 50°F for seven days minimum if normal concrete (Type I cement) is used and for three days minimum if high early strength concrete (concrete with Type III cement, 100 pounds cement added per cubic yard concrete, or a non-chloride accelerator added).
 6. Concrete not loaded during construction shall be protected a minimum of 3 days for normal concrete and 2 days for high early strength concrete to obtain safe form stripping strength. Concrete fully loaded during construction shall be protected for whatever time period is required to obtain the required strength as determined by nondestructive strength tests (Windsor probe, Swiss Hammer Test) on the in-place concrete.
 7. Heat the mixing water and then blend hot and cold water to obtain concrete no more than 10°F above the required temperature.
 8. Heat the aggregates by circulating steam in pipes placed in the storage bins for air temperatures consistently below 32°F. When either water or aggregate is heated to over 140°F combine them in the mixer first to obtain a maximum temperature of the mixture not to exceed 140°F in order to prevent flash set of the concrete.

9. Uniformly thaw aggregates far in advance of batching to prevent moisture variations in the stockpile.
10. Cover warmed stockpiles with tarps to retain heat.
11. Place air entraining admixture in the batch after the water temperature has been reduced by mixing with cooler solid materials.
12. Use wind screens to protect concrete from rapid cooling.
13. Place vertical pump lines inside the building, if possible, for concrete being pumped.
14. Maintain artificial heat as low as possible to reduce temperature stresses during cooling.
15. Avoid water curing of concrete except for parking garage structures. Apply the required curing compound to unformed surfaces as soon as possible to prevent drying of concrete from heated enclosures.
16. Delay form stripping as long as possible to help prevent drying from heated enclosures and to reduce damage to formed surfaces caused by premature stripping.
17. Provide triple thickness of insulating materials at corners and edges vulnerable to freezing.
18. Wrap protruding reinforcing bars with insulation to avoid heat drain from the warm concrete.
19. Gradually reduce the heat at the end of the heating period to reduce likelihood of thermal shock.

3.12 MISCELLANEOUS CONCRETE ITEMS

- A. Filling-In: Fill-in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.

- D. Grout base plates and foundations as indicated, using specified non-shrink, non-metallic grout. Use high-flow grout where high fluidity and/or increased placing time is required. This grout shall be used for all base plates larger than 10 square feet.
- E. Steel Pan Stairs: Provide concrete fill for steel pan stair treads and landings and associated items. Cast-in safety inserts and accessories as shown on drawings. Screed, tamp and finish concrete surfaces as scheduled.
- F. Installation of Adhesive Anchors Using Injectable Epoxy or Adhesive: A representative of the adhesive manufacturer shall be present for the first three holes that are drilled and filled with adhesive. After drilling the hole to the diameter and depth recommended by the manufacturer, clean the hole with a wire or nylon brush. Blow the dust out of the hole using compressed air with a nozzle that reaches to the bottom of the hole. When using adhesive from a new pack, the adhesive that is discharged from the mixing nozzle should be a uniform gray color before any adhesive is installed in the hole. Fill the hole with adhesive starting from the very bottom of the hole until the hole is about 2/3 full. Do not leave an air pocket at the bottom of the hole. Insert the anchor rod or dowel by slowly twisting it into the hole.

3.13 CONCRETE SURFACE REPAIRS

- A. Definition - Defective Areas:
 - 1. Formed Surfaces: Concrete surfaces requiring repairs shall include all honeycombs, rock pockets and voids exceeding 1/4" in any dimension, holes left by tie rods or bolts, cracks in excess of 0.01" and any other defects that affect the durability or structural integrity of the concrete.
 - 2. Unformed Surfaces: Concrete surfaces requiring repair shall include all surface defects such as crazing, cracks in excess of 0.01" wide or cracks which penetrate to reinforcement or through the member, popouts, spalling and honeycombs.
- B. Classification:
 - 1. Structural Concrete Repair: Major defective areas in concrete members that are load carrying (such as shear walls, beams, joists and slabs), are highly stressed, and are vital to the structural integrity of the structure shall require structural repairs. Structural concrete repairs shall be made using a two-part epoxy bonder, epoxy mortar or specified polymer repair mortar. The Engineer shall determine the locations of required structural concrete repairs.
 - 2. Cosmetic Concrete Repair: Defective areas in concrete members that are non-load carrying and minor defective areas in load carrying concrete members shall require cosmetic concrete repair when exposed to view and not covered up by architectural finishes. Cosmetic concrete repairs may be made using a polymer repair mortar and compatible bonding agent. The

Architect/Engineer shall determine the locations of required cosmetic concrete repairs. Stains and other discolorations that cannot be removed by cleaning and are exposed to view will require cosmetic repair. Cosmetic concrete repair in exposed-to-view surfaces will require Architect's approval prior to patching operation.

3. Slab Repairs: High and low areas in concrete slabs shall be repaired by removing and replacing defective slab areas unless an alternate method, such as grinding and/or filling with self-leveling underlayment compound or repair mortar is approved by the Architect/Engineer. Repair of slab spalls and other surface defects shall be made using epoxy products as specified above and as determined by the Engineer. The high strength flowing repair mortar may be used for areas greater than 1 inch in depth.

3.14 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. See Testing Laboratory Services section of these Specifications for concrete materials and cast-in-place concrete inspection and test requirements.

3.15 INVESTIGATION OF LOW CONCRETE STRENGTH TEST RESULTS

- A. Contractor Responsibility for Low Strength Concrete:

1. If the average of any three consecutive strength tests falls below the required $f'c$ for a class of concrete but no individual strength test is more than 500 psi below $f'c$, the Contractor shall immediately notify the Engineer by telephone or e-mail and take immediate steps to increase the average of subsequent strength tests.
2. If any individual strength test falls more than 500 psi below the required $f'c$, the Contractor shall immediately notify the Engineer by telephone or e-mail and take immediate steps to assure that the load-carrying capacity of the structure is not jeopardized.

- B. Additional Field Tests to Confirm Low Concrete Strengths:

1. The cost of all investigations of low-strength concrete, as defined by any individual strength test being more than 500 psi below the required $f'c$, shall be borne by the Contractor.
2. Code-Prescribed Acceptance: The only accepted field-test methods of determining actual in-situ concrete strength is by the way of core tests as prescribed by ACI 318.
3. Non-Destructive Tests: If any individual strength test falls more than 500 psi below the required $f'c$, the Engineer may request that non-destructive field tests be performed on the concrete in question using Swiss Hammer, Windsor Probe, or other appropriate methods as approved by the Engineer. Report the comparative test results of the suspect concrete under consideration with identical tests done on concrete of known strength and of the same class. The Engineer considers these test results as only

approximate indicators of strength and may not necessarily, by themselves, resolve the low concrete strength issue. These test results will be considered as additional information by which to make an informed judgment. The Engineer reserves the right to accept the concrete based on the results of these approximate tests or order that core tests be taken as prescribed below. At the Contractor's option, the approximate non-destructive field-tests may be waived and core tests immediately initiated.

4. Core Tests: If, in the opinion of the Engineer, the likelihood of low-strength concrete is confirmed and it has been determined that the load-carrying capacity of the structure is significantly reduced as a result, the Engineer may request that core tests be taken from the area in question as directed by the Engineer. There shall be a minimum of three cores taken for each strength test more than 500 psi below the required $f'c$ in accordance with ASTM C42. If concrete in the structure will be dry under service conditions, cores shall be air dried (temperature 60° to 80°F, relative humidity less than 60 percent) for 7 days before test and shall be tested dry. If concrete in the structure will be more than superficially wet under service conditions, cores shall be immersed in water for at least 40 hours and tested wet. The Contractor shall fill all holes made by drilling cores with an approved drypack concrete.
5. Acceptance Criteria for Core Test: Concrete in an area represented by core tests shall be considered adequate if the average of three cores is equal to at least 85% of the required $f'c$ and no single core is less than 75% of the required $f'c$. If approved by the Engineer, locations of erratic core strengths may be retested to check testing accuracy.
6. Load Test: If the concrete strength is not considered adequate based on core tests and the structural adequacy remains in doubt, the Engineer may order a load test as specified in ACI 318 be conducted for the questionable portion of the structure.
7. Strengthening or Demolition of the Structure: If the structural adequacy of the affected portion of the structure remains in doubt following the load test, the Engineer may order the structure to be strengthened by an appropriate means or demolished and rebuilt at the Contractor's expense.

END OF SECTION 03 30 00

SECTION 06 0500
COMMON WORK RESULTS FOR WOOD, PLASTICS, AND COMPOSITES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes work results requirements that are common to all other Division 06 Sections.

1.2 SUBMITTALS

- A. Product Data:
1. Maintenance recommendations.
 2. Wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used.
 - a. Include written instructions for handling, storing, and finishing treated material.
 3. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Site.
 4. Fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
 5. Certification that chemical treatment complies with specification for each type of treatment.
 6. Acknowledgement of the detrimental effect of copper treated wood when in contact with untreated steel.

1.3 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Where indicated, provide materials with fire-test-response characteristics determined by a nationally recognized testing and inspecting agency according to ASTM D5664.
- B. Kiln dry all wood to the following maximum moisture content:
1. Exterior and non-conditioned spaces: 19 percent
 2. Interior, conditioned spaces: 15 percent
- C. Ensure all preservative is adequately fixed in wood. Reject lumber with surface residues of white salts. Provide wood that is kiln-dried after treatment or prefinished with a sealer.
- D. Obtain approvals from Building Official for alternative wood preservative treatment.
- E. Products used within the interior of the building shall contain no added formaldehyde including glues.
1. Emission standards for particleboard, medium density fiberboard, hardwood plywood, and finished goods made with them must meet the EPA's publication "The Formaldehyde Emission Standards for Composite Wood Products Act of 2010"

1.4 PROJECT CONDITIONS

- A. Coordinate environmental requirements for casework installation areas. Do not deliver or install casework until temperature and relative humidity have been stabilized and will be maintained.
 - 1. Maintain temperature and humidity in installation area as required to maintain moisture content of installed casework within a 1.0 percent tolerance through date of Substantial Completion.
- B. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit work to be performed according to manufacturer's written instructions and warranty requirements and at least one coat of specified finish to be applied without exposure to rain.
- C. Verify dimensions by field measurement before fabrication where work adjoins other Work. Notify Architect of conditions that may cause delay to Project. Allow for trimming and fitting of cabinet work and trim.
- D. Coordination: Fit work to other Work; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports and reinforcement to allow proper attachment of other work.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect materials against weather and contact with damp or wet surfaces. Provide for air circulation within and around stacks and under temporary coverings.

PART 2 - PRODUCTS

2.1 PRESSURE TREATMENT OF WOOD

- A. Water Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propenyl butyl carbonate (IPBC) as its active ingredient.
- B. Preservative Treatment. Comply with performance requirements in AWPA U1.
 - 1. ACQ - Ammoniacal copper quarternary compound: Pressure-injected
 - 2. Use 0.25 lb/cu ft retention
 - 3. Kiln dry after treatment to 19 percent maximum moisture content for lumber and 18 percent for plywood
 - 4. Optional Preservative Treatments:
 - a. CDDC: Copper hydroxide sodium dimethyldithiocarbamate
 - b. Acetylation process
- C. Acceptable Products:
 - 1. NatureWood by Osmose, Inc.
 - 2. Preserve Plus by Chemical Specialties, Inc.
 - 3. Accoya Wood by Accsys Technologies

2.2 FIRE-RETARDANT-TREATMENT

- A. Fire-Retardant Particleboard: Panels made from softwood particles and fire-retardant chemicals mixed together at time of panel manufacture with flame-

spread index of 25 or less and smoke-developed index of 25 or less per ASTM E 84.

- B. Fire-Retardant Fiberboard: ANSI A208.2 medium-density fiberboard panels made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at time of panel manufacture with flame-spread index of 25 or less and smoke-developed index of 200 or less per ASTM E 84.
- C. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
 - 1. Exterior Type: Treat materials after being subjected to accelerated weathering according to ASTM D2898. Use Exterior type for exterior locations and where indicated.
 - 2. Interior Type: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D3201 at 92 percent relative humidity. Use where exterior type is not indicated.
- D. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.
- E. Install FT products where indicated and the following:
 - 1. Concealed blocking in rated partitions
 - 2. Plywood backing panels.
 - 3. Other locations detailed on Drawings

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine structure and conditions under which work is to be installed. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 APPLICATION

- A. Brush apply preservative treatment material to cut ends of treated lumber. Use same material as used for original treatment.
- B. Installation of Pressure Treated Wood: No direct contact with untreated steel shall be allowed. Provide coating or sheet barriers to separate treated wood from steel. Apply only stainless steel fasteners into or through copper preservative treated wood.

3.3 ADJUSTMENTS, CLEANING, AND PROTECTION

- A. Protect installed woodwork from damage by other trades until the Date of Substantial Completion.

END OF SECTION 06 0500

SECTION 06 1000
ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Solid sawn wood decking

1.2 REFERENCES

- A. Lumber Standard: Comply with PS-20 and with applicable rules of the respective grading and inspecting agencies for species and products indicated.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber as well as plywood and other panels; provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar materials.
1. For pressure treated lumber and plywood, place spacers between each bundle to provide air circulation.

PART 2 - PRODUCTS

2.1 LUMBER, GENERAL

- A. Lumber Standards: Furnish lumber manufactured to comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.
- B. Inspection Agencies: SPIB - Southern Pine Inspection Bureau.
- C. Grade Stamps: Provide lumber with each piece factory-marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.
- D. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use.
1. Provide dressed lumber, S4S, unless otherwise indicated.
 2. Provide seasoned lumber with 19 percent maximum moisture content at time of dressing and shipment for sizes 2 inches or less in nominal thickness, unless otherwise indicated.
 3. "Standard" grade.
 4. Southern Pine graded under SPIB rules.

2.2 LUMBER CEILING

- A. Provide kiln-dried lumber siding complying with DOC PS 20
- B. Species and Grade: Grade 1 Common, pressure-preservative-treated Southern Yellow Pine; SPIB.

- C. Pattern: V-edge, smooth-faced tongue-and-groove pattern with eased edges, nominal width and thickness of 4 inches by 3/4 inch.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Discard units of material with defects that impair quality of rough carpentry construction and that are too small to use in fabricating rough carpentry with minimum joints or optimum joint arrangement.
- B. Install per roof manufacturer's details meeting windloading requirements.

3.2 FINISH

- A. Stain visible surfaces to match Architect's sample using a stain product formulated for pressure treatment, fire retard treatment and exterior applications.

END OF SECTION 06 1000

SECTION 13 3419
METAL BUILDING SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes pre-engineered building, including, but is not limited to:
 - 1. Pre-engineered structural frame system including straight columns.
 - 2. Pre-engineered structural roof panel system.
 - 3. Fascia.

1.2 BUILDING DESCRIPTION

- A. Primary Structural: Frames shall consist of welded up plate section columns and roof beams complete with splice plates for bolted field assembly. All bolts for field assembly of primary structural system shall be high-strength bolts.
 - 1. Columns shall be welded straight "H" sections and sized such that they will fit within the space allotted in the Architectural drawings.
 - 2. Connection of all major structural members shall be made with A325 high-tensile bolts through prepunched or predrilled holes for alignment.
 - 3. All structural steel shall be prepared and factory primed.
- B. Secondary Structural: Purlins or girts, eve struts, and framed openings factory primed.

1.3 SUBMITTALS

- A. AISC Certification: Submit proof of AISC Certification.
- B. Product Data: Product information, specifications, and published details for building components, accessories.
- C. Shop Drawings: Show roof framing, worse case reactions, covering and trim details, and accessory installation details to indicate assembly of building components.
 - 1. Shop Drawings shall be sealed, certified, and signed by a Professional Engineer registered in Florida
- D. Certifications:
 - 1. Letter of certification prepared and signed by a Professional Engineer, registered to practice in the State of Florida, verifying the metal building system design and metal roof system design (including panels, clips, and support system components) meet indicated loading requirements and codes of authorities having jurisdiction.
 - a. Reference specific dead, live, wind loads/speeds (including edge zone wind pressures), tributary area live load reduction (if applicable), concentrated loads, collateral loads, auxiliary loads, end use categories, and governing code bodies (including year).
 - 2. Dealer Certification: Certify the building system supplier is a manufacturer's authorized and franchised dealer of the system to be furnished. State date authorization was granted.
 - 3. Installer Certification: Certify the building installer has been regularly

engaged in the installation of buildings systems of the same or equal construction to the system specified.

E. Sample warranties

1.4 QUALITY ASSURANCE

A. AISC Certification: Building System Manufacturer shall be American Institute of Steel Construction.

B. Erector Qualifications: An experienced erector who has specialized in erecting and installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer.

C. Material Testing: In addition to mill certifications of structural steel, provide, upon request, evidence of compliance with specification through testing independent of the manufacturer's suppliers. This quality assurance testing to include structural bolts, nuts, screw fasteners, mastics, and metal coating (primers, metallic coated products, and painted coil products).

D. Design Loads

1. Governing Design Code: Structural design for the building structural system shall be provided by the building manufacturer in compliance with the FBC.

2. Roof Live Load: Roof live loads are loads produced during the life of the structure by moveable objects.

3. Wind Load: Wind Pressure Coefficients and the design pressures shall be applied per FBC; See Structural Documents for wind and design pressures.

4. Dead Load: The weight of the building system construction, such as roof, framing, and covering members.

5. Collateral Load: Additional imposed loads required by the Contract Documents other than the weight of the metal building system. These added loads could include such items as sprinklers, mechanical, electrical and ceiling systems.

6. Auxiliary Loads: All dynamic loads required by the contract documents such as suspended items.

7. Load Combinations: Load combinations used to design primary and secondary structural members shall be according to the governing code.

E. Structural Design Practice - Deflections

1. Calculations for deflections shall be done using only the bare frame method. Reductions based on engineering judgment using the assumed composite stiffness of the building envelope shall not be allowed. Drift shall follow AISC's "Serviceability Design Considerations for Low-Rise Buildings" and the design criteria indicated in the drawings which ever is worse. The use of composite stiffness for deflection calculations is permitted only when actual calculations for the stiffness are included with the design for the specific project. Deflection calculations shall be included in the design data submittals.

F. Roof System Design - Roof panels shall be designed in accordance with AISI "Specifications for the Design of Light-Gage, Cold-Formed Steel Structural

Members."

1. Water Penetration: No water penetration when tested according to ASTM E 1646 at the following test-pressure difference:
 - a. Test-Pressure Difference: 2.86 lbf/sq.ft.
 - b. Positive Preload Test-Pressure Difference: Greater than or equal to 15.0 lbf/sq. ft. and the greater of 75 percent of building live load or 50 percent of building design positive wind-pressure difference.
 - c. Negative Preload Test-Pressure Difference: 50 percent of design wind-uplift-pressure difference.

1.5 WARRANTIES

- A. Furnish a written 10 year weathertightness warranty from the Date of Substantial Completion against perforation of metal roof panels due to corrosion under normal weather and atmospheric conditions.
 1. Warranty shall include, but not be limited to, metal roofing, fascias, flashings, cap flashings, closures and trims, fasteners, accessories, sealants, and watertight connection to downspouts.
 2. Warranty shall not be limited by windloading less than the design windloading and wind uplift. Include a wind warranty rider up to the designed wind and design pressures.
- B. Provide manufacturer's standard paint film written warranty for twenty (20) years from Date of Substantial Completion against cracking, peeling, chalking, and fading of the coating on painted, painted roof panels and soffit panels. Warranty shall be signed by building system or roof system manufacturer.
- C. Inspection and Report Services: Metal roof system manufacturer or his authorized agent shall perform an inspection of the entire roof system and submit a written report detailing all conditions requiring maintenance and repair by parties under the above warranties. Inspections and reports shall be performed once every other year over the 10 year weathertightness warranty period. Cost of Inspection and Report Services shall be included in the contract amount.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products of the following manufacturers are acceptable provided compliance with technical requirements as specified.
 1. Poligon Structure HXE, 58', 15' HT
 2. Icon Shelter by Dominica Recreation Products
 3. Americana Building Products, Top line Recreation

2.2 GENERAL

- A. Structural system design shall be a clear span rigid frame with straight columns, and roof beams with hip roofs.
- B. Roof Slope: Refer to Drawings.
- C. Field modification of parts shall be in accordance with the best standard procedures and require written signed and sealed approval from the

manufacturer.

D. Foundations

1. Show foundations including anchor bolt embedment length on Shop Drawings, in accordance with the best recommended practices for the specific soil conditions of the building site.
 - a. All reactions for the design of foundations shall be supplied by metal building manufacturer. Do not submit reams of reactions from every possible load combination. The reactions shall be culled down to only the worse case scenarios.
2. Anchor bolt diameter shall be as specified by manufacturer's standard anchor bolt layout drawings.

2.3 STRUCTURAL STEEL DESIGN

- A. All structural mill sections or welded-up plate sections shall be designed in accordance with the AISC "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings", and all cold-formed steel structural members shall be designed in accordance with the AISI "Specification for the Design of Cold-Formed Steel Structural Members".
- B. Include electrical and mechanical hanging loads and all other items that are supported from the metal building system. Coordinate with all other Contract Documents. Extra costs for this work will not be allowed.

2.4 PRIMARY FRAMING

A. Rigid Frames

1. Frames shall consist of welded-up plate section columns and roof beams complete with necessary splice plates for bolted field assembly.
 - a. All base plates, cap plates, compression splice plates and stiffener plates shall be factory welded into place and have the connection holes shop fabricated.
 - b. Columns and roof beams shall be fabricated complete with holes in webs and flanges for the attachment of secondary structural members and bracing except for field work as noted on shop Drawings.
2. All bolts for field assembly of frame members shall be high strength bolts as indicated on erection drawings.

2.5 SECONDARY STRUCTURAL MEMBERS

A. Purlins and Girts

1. Purlins and Girts: "Precision roll formed
2. Outer flange of all girts shall contain factory-punched holes for panel connections. Optional girts are also acceptable without factory punched holes for panel connections.
3. Outer flange of purlins shall contain factory-punched holes for panel connections. Optional purlins are also available without factory punched holes for panel connections on ribbed roof systems only.

- B. Eave Struts: Same depth as purlins.
- C. Bracing
 - 1. Diagonal bracing shall be hot-rolled rod of size as required by design.
 - 2. Optional pinned base portal frames may be substituted for wall rod bracing on buildings as required.
 - 3. Flange braces and purlin braces, when required, shall be cold formed and installed as indicated in the submittals.

2.6 WELDING

- A. Welding procedure and operator qualifications and welding quality standards shall be in accordance with the American Welding Society structural welding code. Inspection other than visual inspection as defined by AWS paragraph 8.15.1, shall be identified and negotiated prior to bidding.

2.7 STRUCTURAL PAINTING

- A. General: Prior to painting all steel shall be cleaned of loose rust, loose mill scale, dirt and other foreign material. Unless otherwise specified, the fabricator shall not sand blast, flame clean or pickle prior to painting.
- B. Primary Frames
 - 1. Clean all steel per SSPC-SP7.
- C. Secondary Structurals
 - 1. Clean all steel per SSPC-SP8.
- D. Paint system: Manufacturer's standard powder coating, black

2.8 ROOF SYSTEM

- A. Roof panels: "SLR" panels by Varco-Pruden or similar profile by other listed manufacturers.
- B. Panels shall be prefinished 50 ksi steel per ASTM A792.
 - 1. Provide 24 gauge "Galvalume" finished panels.
 - 2. Galvalume sheet shall be produced in accordance with ASTM A792 and shall have a coating designation of AZ55.
 - 3. Oil coating shall be kept at a minimum. Clean panels of all oil prior to shipment.
 - 4. Use clean, dry gloves during handling and installation.
 - 5. Care shall be exercised to prevent the roofing panels from sliding over each other during shipment and installation.
 - 6. Apply clear coat at factory. Coating shall be a clear acrylic coating applied to both sides of the sheet. Acrylic coating shall contain chromium.
- C. Panels shall be fabricated in full lengths from ridge to eave without end laps.
- D. Ridge assembly shall be designed to allow roof panels to move lengthwise with expansion/contraction as the roof panel temperature changes. Panel closures and interior reinforcing straps shall be installed to seal the panel ends at the ridge. The attachment fasteners shall not be exposed on the weather side. A lockseam plug shall be used to seal the lockseam portion of the panel. A hi-

tensile steel ridge cover shall span from panel closure to panel closure and flex as the roof system expands and contracts.

- E. The roof panel shall not be considered to be a safe work platform until completely secured to the structural system. Therefore, walkboards or other safety equipment as required by safety standards shall be provided by the erecting contractor to provide worker safety during panel installation.
- F. Provision for thermal expansion movement of the roof panels shall be accomplished by the use of clips with a moveable tab. Stainless steel tabs shall be factory centered on the roof clip when installed to assure full movement in either direction. A force of no more than 8 pounds shall be required to initiate tab movement. Each clip shall accommodate a minimum of 1.25" in either direction.
- G. The roof shall provide for thermal expansion/contraction without detrimental effect of the roof panel when there is a +100 degree F. temperature difference between the inside structural framework of the building and the temperature of the roof panels.

2.9 TRIM AND FLASHINGS

- A. All exterior trim shall be the same finish as the roof panels specified above.
- B. Flashings, trim, closures, and similar items shall be as detailed on Drawings and supplied by the manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected.
- B. Install pre-engineered building, components, accessories, roof panels, and all related items in strict accordance with final Shop Drawings and manufacturers written installation instructions.
 - 1. Coordinate installation with other trades.

3.2 FRAMING

- A. Erect framing in accordance with AISC Specification.
- B. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation of permanent bracing.
- C. Set column base plates with non-shrink grout to achieve full plate bearing.
- D. Do not field cut or alter structural members without written approval of Architect.
- E. After erection, prime welds, abrasions, and surfaces.
- F. All steel shall be clean and free of mud, dirt, and debris at completion of erection.

3.3 ROOFING SYSTEMS

- A. Install in accordance with final Shop Drawings and manufacturer's instructions.
- B. Exercise care when cutting prefinished material to ensure cuttings do not remain

on finish surface.

- C. Fasten cladding system to structural supports, aligned level and plumb.
- D. Locate end laps over supports. End laps minimum 2 inches. Place side laps over bearing.
- E. Provide expansion joints where required by the manufacturer and as may be indicated.
- F. Use concealed fasteners.
- G. Install sealant and gaskets to prevent weather penetration.

END OF SECTION 13 3419

SECTION 31 3116
CHEMICAL TERMITE CONTROL

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes soil treatment for termite control.

1.2 SUBMITTALS

- A. Product Data:
1. Chemicals and products used
 2. Certification that products used comply with U.S. Environmental Protection Agency (EPA) regulations, State of Florida, for termiticides.
 3. Information that soil treatment conforms to specified requirements
- B. Provide information regarding the type of equipment to be used to apply the soil treatment, size of volume mixing tank, the pump capacity in gallons per minute, and the application tools with in-line flow meter devices attached.
- C. Certificate of Compliance: Submit as part of the Close-Out Documents the following statement from the pest control company: "The building has received a complete treatment for the prevention of termites. Treatment is in accordance with rules and laws established by the Florida Department of Agriculture and Consumer Services."
- D. Applicator Qualifications
- E. Job site log book
- F. Sample warranty

1.3 QUALITY ASSURANC

- A. Applicator Qualifications: Materials shall be installed by a bonded exterminator, licensed in the State of Florida for application of soil treatment solutions, and showing evidence of five years continuous business operation under the current name.
- B. Application: Perform application in compliance with the Florida statutes, Chapter 482 and 10D-55, and other state and federal laws.
- C. Use only termiticides that bear a federal registration number of the EPA and are approved by local authorities having jurisdiction.

1.4 JOB CONDITIONS

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

1.5 REGULATORY REQUIREMENTS

- A. Minimum requirements for application as authorized by the State of Florida to fulfill the work according to manufacturer's specifications.

1.6 PROJECT RECORD DOCUMENTATION

- A. Log Book to be kept at job site and to include:
 - 1. Project name
 - 2. Company providing treatment
 - 3. Applicator's name
 - 4. Time of arrival and departure
 - 5. Product name
 - 6. Record date of all applications
 - 7. Rate of application to all required areas of the designated site
 - 8. All areas to be treated
 - 9. The soil treatment trade name
 - 10. Quantity of concentrate delivered to the site
 - 11. Quantity used for the designated treated areas
 - 12. The percentage of active ingredient in diluted form
 - 13. Finished gallons of soil treatment for each application
 - 14. Linear and square footage amount to determine total finished soil treatment used
- B. Owner's representative will observe both the amount of concentrate delivered to the site and the empty units that total the amount used to the treated areas. The Owner's representative shall sign the logbook as noted.
 - 1. Notify Owner's Representative 48 hours prior to application.

1.7 DELIVERY

- A. Products must be delivered to the jobsite in the original sealed and labeled containers of the manufacturer.

1.8 WARRANTY

- A. Provide a written service agreement stating that soil treatment will prevent termites from attacking the building and its contents for a period of not less than five years from Date of Substantial Completion. The soil treatment firm to inspect the structure(s) annually and retreat as necessary. The service agreement shall cover any damage during the warranty period and repairs to damaged surfaces up to 50,000 dollars.
- B. Offer owner an optional renewal contract of services for the same terms.
- C. The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.
- D. If, because of the length of Contract time, re-treatment(s) or re-inspection(s) are required for maintenance of the guarantee, perform at no additional cost to the Owner.

1. Re-treat soil to prevent termites from attacking the building(s) or its contents, using means acceptable to the Owner, if termite activity is found to exist in or under the structure(s) during the guarantee period, without additional expense to the Owner. Make good damage caused by termite activity.

PART 2 - PRODUCTS

2.1 SOIL TREATMENT SOLUTION

- A. Label chemical container, indicating types and percentages of toxicants (chemicals) used, and precautions to be observed in their use. Deliver copies of MSD Sheets with chemical containers. File SDS at Job Site.
- B. Acceptable Products:
 1. Fipronil: Termidor 80WG by BASF
 2. Chloronicotinyl: Premise 75 by Bayer Corp.
 3. Chlorpyrifos: Dursban TC by Dow AgroSciences LLC
 4. Cypermethrine:
 - a. Prevail FT by FMC Corp.
 - b. Demon MAX by Syngenta Professional Products
 5. Permethrin:
 - a. Dagnet SFR by FMC Corp.
 - b. Prelude by Zeneca
- C. Dilute with water to concentration level recommended by manufacturer.
- D. Add a dye solution for visual identification of the solution.

2.2 NOTICE OF TERMITE PROTECTION

- A. Signage: Permanent, identifying the treatment provider and required re-inspection and treatment contract renewal(s).

PART 3 - EXECUTION

3.1 APPLICATION

- A. Treatment shall comply with manufacturer's specifications as they currently apply to the treatment of commercial buildings under construction.
- B. Surface Preparation: Remove foreign matter that could decrease treatment effectiveness 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 placing compacted fill under slabs if recommended by toxicant manufacturer.
- C. Solution mix shall be in accordance with the termiticide Specimen Label as required for termites. Solution shall be mixed on site.

3.2 TIME OF APPLICATION

- A. Begin soil poisoning after all foundation and slab preparations have been made and prior to the placement of any vapor barriers (or other barriers).

- B. Do not apply treatment when surface water is present or if inclement weather is expected which would disturb final placement.

3.3 APPLICATION RATES

- A. Application Rates: Apply the soil treatment listed above as a water emulsion at not less than the percentage (in finished solution) designated according to manufacturer's label specification.
- B. Spaces in floor slab that are boxed out or cut away shall use a metal form of sufficient depth to eliminate any planed soil disturbances after initial treatment.

3.4 SIGNS

- A. Post signs in areas of application to warn workers that soil termiticide treatment has been applied. Remove signs after areas are covered by other construction.
- B. Post Notice of Termite Protection signage near water heater and main electrical panel.

3.5 RE-TREATMENT

- A. Reapply soil treatment solution to areas disturbed by subsequent excavation, weather, landscape grading, or other activities following application.

END OF SECTION 31 3116

SECTION 32 1816
PLAYGROUND SURFACE SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes Poured recreational and high-traffic surfacing system.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include the following:
1. Maintenance recommendations
- B. Color sample charts
- C. Mock-up
- D. Field Quality Control reports
- E. Sample warranty

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Approved and trained by the manufacturer of the surface, having experience with other projects of the scope and scale of this Project.
- B. If critical fall height is required, submit impact attenuation test results showing surface complies with ASTM 1292 Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment for the critical fall height of the equipment.
- C. Mock-up: Provide a 30 inch square minimum sample for architect to review for color, texture and critical fall height as they deem necessary.

1.4 PROJECT CONDITIONS

- A. Environmental Requirements: Install surface when minimum ambient temperature is 40 degrees F and maximum ambient temperature is 90 degrees F. Do not install in steady or heavy rain.

1.5 WARRANTY

- A. Written statement on manufacturer's letterhead certifying that the top surface will not discolor via fading for a period of 5 years from date of installation

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Evertop System by Surface America, Inc. or Architect approved equal.

2.2 MATERIALS

- A. Material: Blend of recycled EPDM (ethylene propylene diene monomer) rubber and aromatic or aliphatic urethane binder.
- B. Thickness as required to achieve critical fall height designated by Owner.
- C. Color: Selected by Architect

- D. Finish Texture: Match existing as closely as possible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions: Verify that substrate conditions are suitable for installation of the surface.
 - 1. Verify drainage is in accordance with manufacturer's recommendations.
- B. Do not proceed with installation until unsuitable conditions are corrected.

3.2 INSTALLATION

- A. General: Comply with playground surface system manufacturer's written preparation and installation instructions.
- B. Remove from substrate any loose or delaminated material that would be deleterious to application of the new surface
- C. Patch substrate in accordance with Manufacturer's recommendations.
- D. Apply recommended primers and allow to cure.
- E. Install surfacing accordance with Manufacturer's instructions and allow to cure.
 - 1. Do not allow foot traffic or use of the surface until it is sufficiently cured.
 - 2. At the end of the minimum curing period, verify that the surface is sufficiently dry and firm to allow foot traffic and use without damage to the surface.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Owner may hire a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Testing Services: Testing and inspecting of completed applications of playground surface system shall take place according to ASTM F 1292.
- C. Remove and replace applications of playground surface system where test results indicate that it does not comply with requirements.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with requirements.

3.4 CLEANING AND PROTECTION

- A. Protect the installed surface from damage resulting from subsequent construction activity on the site.

END OF SECTION 32 1816

SECTION 32 3100
FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Galvanized-steel chain link fabric
 - 2. Polyvinyl chloride (PVC)-coated steel chain link fabric

1.2 SUBMITTALS

- A. Product Data: Manufacturer's technical data and specifications for fence and gate posts, fabric, gates, gate operators, and accessories.
- B. Shop Drawings: Show location of fence, gates, each post, and details of post installation, extension arms, gate swing, hardware, and accessories.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has at least three years' experience and has completed at least five chain link fence projects with same material and of similar scope to that indicated for this Project with a successful construction record of in-service performance.
- B. Single-Source Responsibility: Obtain chain link fences and gates, including accessories, fittings, and fastenings, from a single source.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver chain link fencing fabric and all components to the Site in protected condition.
- B. Store undercover as directed by the chain link manufacturer.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify layout information for fences and gates shown on the Drawings in relation to the property survey and existing structures. Verify dimensions by field measurements.
- B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Architect not less than 2 days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Architect's written permission.

PART 2 - PRODUCTS

2.1 FABRIC

- A. Selvage: Knuckled on both selvages.
- B. Steel Chain-Link Fence Fabric: Fabricated in one-piece widths for fencing 12

feet and less in height to comply with Chain Link Fence Manufacturers Institute (CLFMI) "Product Manual" and with requirements indicated below:

1. Mesh and Wire Size: 2-inch mesh, 0.192-inch diameter (6 gage).
2. Coating: ASTM F 668, Class 1, PVC.
3. PVC Coating Color: Black, complying with ASTM F 934.

2.2 FRAMING

- A. Type I Round Posts: Standard weight (schedule 40) galvanized-steel pipe conforming to ASTM F 1083, according to heavy industrial requirements of ASTM F 669, Group IA, with minimum yield strength of 25,000 psi, not less than 1.8 oz. of zinc per sq. ft. Type A coating inside and outside according to ASTM F 1234, as determined by ASTM A 90, and weights per foot as follows:

| <u>Actual OD</u> | <u>Weight (lb/ft)</u> | <u>NPS Size</u> |
|------------------|-----------------------|-----------------|
| 1.315 | 1.68 | 1 |
| 1.660 | 2.27 | 1-1/4 |
| 1.900 | 2.72 | 1-1/2 |
| 2.375 | 3.65 | 2 |
| 2.875 | 5.79 | 2-1/2 |
| 3.500 | 7.58 | 3 |
| 4.000 | 9.11 | 3-1/2 |
| 6.625 | 8.97 | 6 |
| 8.625 | 28.55 | 8 |

- B. Supplemental Color Coating: In addition to above metallic coatings, provide posts and rails with manufacturer's standard polymer coating according to ASTM F 1234, 10-mil minimum polyvinyl chloride (PVC) or 3-mil minimum polyester plastic resin finish applied to exterior surfaces and, except for tubular shapes, to exposed interior surfaces. Color to match chain link fabric.
- C. Top Rail: Manufacturer's longest lengths (17 to 21 feet) with swaged-end or expansion-type coupling, approximately 6 inches long for joining. Provide rail ends or other means for attaching top rail securely to each gate corner, pull, and end post.
1. Round Steel: 1.660-inch OD Type I or II steel pipe.
- D. Steel posts for fabric heights up to 6 feet:
1. Round Line or Intermediate Posts: 1.90-inch OD Type I or II steel pipe.
 2. Round End, Corner, and Pull Posts: 2.375-inch OD Type I or II steel pipe.
- E. Swing Gate Posts: Furnish posts to support single gate leaf, or one leaf of a double-gate installation, according to ASTM F 900, sized as follows for steel and aluminum pipe posts:
1. Steel posts for fabric height of 6 feet or less and gate leaf width:
 - a. Up to and Including 4 Feet: 2.375-inch OD pipe weighing at least 3.11 lb per ft.
 - b. Over 4 to 10 Feet: 2.875-inch OD pipe weighing at least 4.64 lb per ft.
 - c. Over 10 to 18 Feet: 4.000-inch OD pipe weighing at least 8.65 lb per ft.

2.3 FITTINGS AND ACCESSORIES

- A. Material: Comply with ASTM F 626. Galvanized iron or steel to suit manufacturer's standards.
1. Steel and Iron: Unless specified otherwise, hot-dip galvanize pressed steel or cast-iron fence fittings and accessories with at least 1.2 oz. zinc per sq. ft. as determined by ASTM A 90.
 2. Supplemental Color Coating: In addition to above metallic coatings, provide a 10-mil minimum polyvinyl chloride (PVC) plastic resin finish applied to exterior surfaces and, except inside cap shapes, to exposed interior surfaces. Color to match chain link fabric.
- B. Post and Line Caps: Provide weathertight closure cap for each post. Provide line post caps with loop to receive tension wire or top rail.
- C. Post Brace Assembly: Manufacturer's standard adjustable brace. Use material specified below for brace, and truss to line posts with 3/8-inch-diameter rod and adjustable tightener. Provide manufacturer's standard galvanized-steel, cast-iron or cast-aluminum cap for each end.
1. Round Steel: 1.660-inch OD Type I or II steel pipe.
- D. Bottom and Center Rail: Same material as top rail. Provide manufacturer's standard galvanized-steel, cast-iron or cast-aluminum cap for each end.
- E. Tension or Stretcher Bars: Hot-dip galvanized steel with a minimum length 2 inches less than the full height of fabric, a minimum cross section of 3/16 inch by 3/4 inch, and a minimum of 1.2 oz. of zinc coating per sq. ft. Provide one bar for each gate and end post, and two for each corner and pull post, except where fabric is integrally woven into the post.
- F. Tension and Brace Bands: 3/4-inch-wide minimum hot-dip galvanized steel with a minimum of 1.2 oz. of zinc coating per sq. ft.
1. Tension Bands: 0.074 inch thick (14 gage) minimum.
 2. Brace Bands: 0.105 inch thick (12 gage) minimum.
- G. Tension Wire: 0.177-inch-diameter metallic-coated steel marcelled tension wire conforming to ASTM A 824 with finish to match fabric.
1. Coating Type II zinc in the following class as determined by ASTM A 90.
 - a. Class 2, with a minimum coating weight of 1.20 oz. per sq. ft. of uncoated wire surface.
- H. Tie Wires: 0.106-inch-diameter (12-gage) galvanized steel with a minimum of 0.80 oz. per sq. ft. of zinc coating according to ASTM A 641, Class 3 or equal, to match fabric wire.

2.4 CONCRETE

- A. Concrete: Provide concrete consisting of portland cement per ASTM C 150, aggregates per ASTM C 33, and potable water. Mix materials to obtain concrete with a minimum 28-day compressive strength of 3000 psi. Use at least four sacks of cement per cu. yd., 1-inch maximum size aggregate, 3-inch maximum slump.

- B. Packaged Concrete Mix: Mix dry-packaged normal-weight concrete conforming to ASTM C 387 with clean water to obtain a 2- to 3-inch slump.
- C. Refer to Division 03 Section, Cast-In-Place Concrete for additional requirements.

2.5 GATES

- A. Fabricate perimeter frames of gates from same material and finish as fence framework. Assemble gate frames by welding. Provide horizontal and vertical members to ensure proper gate operation and attachment of fabric, hardware, and accessories. Space frame members maximum of 8 feet apart unless otherwise indicated.
 - 1. Fabric: Same as for fence unless otherwise indicated. Secure fabric at vertical edges with tension bars and bands and to top and bottom of frame with tie wires.
 - 2. Bracing: Install diagonal cross-bracing consisting of 5/16-inch-diameter adjustable-length truss rods on gates to ensure frame rigidity without sag or twist.
- B. Swing Gates: Comply with ASTM F 900.
 - 1. Steel: Gates up to 8 feet wide:
 - a. Up to 6 Feet High: Fabricate perimeter frames of 1.660-inch minimum OD Type I or II steel pipe or 1-1/2-inch-square galvanized-steel tubing weighing 1.84 lb per sq. ft.
 - b. Over 6 Feet High: Fabricate perimeter frames of 1.90-inch minimum OD Type I or II steel pipe or 2-inch-square galvanized-steel tubing weighing 2.52 lb per sq. ft.
 - 2. Gate Hardware: Provide galvanized hardware and accessories for each gate according to the following:
 - a. Hinges: Size and material to suit gate size, non-lift-off type, offset to permit 180-degree gate opening. Provide 1-1/2 pair of hinges for each leaf over 6-foot nominal height.
 - b. Latch: Forked type or plunger-bar type to permit operation from either side of gate, with padlock eye as an integral part of latch.
 - c. Keeper: Provide a keeper for vehicle gates that automatically engages gate leaf and holds it in the open position until manually released.
 - d. Gate Stops: Provide gate stops for double gates consisting of mushroom-type flush plate with anchors, set in concrete, and designed to engage a center drop rod or plunger bar. Include a locking device and padlock eyes as an integral part of the latch, permitting both gate leaves to be locked with a single padlock.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install fence to comply with ASTM F 567. Do not begin installation and erection before final grading is completed, unless otherwise permitted.
 - 1. Apply fabric to outside of framework. Install fencing on boundary lines

inside of property line established by survey.

- B. Excavation: Drill or hand-excavate (using post-hole digger) holes for posts to diameters and spacings indicated, in firm, undisturbed or compacted soil.
 - 1. If not indicated on Drawings, excavate holes for each post to minimum diameter recommended by fence manufacturer, but not less than four times the largest cross section of post.
 - 2. Unless otherwise indicated, excavate hole depths approximately 3 inches lower than post bottom, with bottom of posts set not less than 36 inches below finish grade surface.
- C. Setting Posts: Center and align posts in holes 3 inches above bottom of excavation. Space a maximum of 10 feet o.c., unless otherwise indicated.
 - 1. Protect portion of posts above ground from concrete splatter. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment, and hold in position during placement and finishing operations.
 - a. Unless otherwise indicated, extend concrete footings 2 inches above grade and trowel to a crown to shed water.
- D. Top Rails: Run rail continuously through line post caps, bending to radius for curved runs and at other posts terminating into rail end attached to posts or post caps fabricated to receive rail. Provide expansion couplings as recommended by fencing manufacturer.
- E. Center Rails: Install center rails in one piece between posts and flush with post on fabric side, using rail ends and special offset fittings where necessary.
- F. Brace Assemblies: Install braces at end and gate posts and at both sides of corner and pull posts. Locate horizontal braces at midheight of fabric on fences with top rail and at two thirds fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.
- G. Bottom Tension Wire: Install tension wire within 6 inches of bottom of fabric before stretching fabric and tie to each post with not less than same gage and type of wire. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch-diameter (11-gage) hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches o.c.
- H. Top Tension Wire: Install tension wire through post cap loops before stretching fabric. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch-diameter (11-gage) hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches o.c.
- I. Fabric: Leave approximately 2 inches between finish grade and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Install fabric on security side of fence, and anchor to framework so that fabric remains under tension after pulling force is released.
- J. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not over 15 inches o.c.
- K. Tie Wires: Use wire of proper length to secure fabric firmly to posts and rails. Bend ends of wire to minimize hazard to persons or clothing.

1. Maximum Spacing: Tie fabric to line posts 12 inches o.c. and to rails and braces 24 inches o.c.
 - L. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts for added security.
- 3.2 GATE INSTALLATION
- A. Install gates plumb, level, and secure for full opening without interference. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary. Install gates according to manufacturer's instructions, plumb, level, and secure.
- 3.3 DEMONSTRATION
- A. Instruct the Owner's personnel on proper operation and maintenance of gate operators.

END OF SECTION 32 3100