Project Manual For

Replacement Facility for Wrangell Medical Center

Volume 2 - Early Release Package - Structural

Architect's Project No. 10528.00

Wrangell, Alaska

March 28, 2012

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Sections are denoted below by a CM for Construction Manager and/or a CC for Component Contract to distinguish between scope of work. Should a section denote both a CM/CC, refer to specification section and construction drawings for separation of scope.

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SECTION 01-1100
SUMMARY OF WORK

PART 1 - GENERAL

1.1 PROJECT DESCRIPTION

A. The Project consists of two separate contracts for construction.

B. Layton Construction shall act as the Construction Manager and shall be responsible for the bidding and awarding of the following scope to subcontractors:
   1. All site work including underground utilities, rough and final grading, all foundations, a 2 hour independent fire wall, building canopies, asphalt and concrete paving, curbs, landscaping, and signage as shown on Contract Documents prepared by David E. Johnson Architect, dated March 21, 2012. The Construction Manager shall also be responsible for the purchase of the emergency generator.

C. The Owner shall work with the Construction Manager to bid and award the following scope to a Component Contractor:
   1. Construction including delivery and installation of a 55,000 square foot one story hospital built using a component construction method, as shown on the Contract Documents prepared by David E. Johnson Architect, dated March 21, 2012. Scope shall include the tie in of all utilities and structural connections between components and work being performed by the Construction Manager.

D. This contract is expected to be funded in whole or in part using funds from the American Recovery and Reinvestment Act (ARRA). Section 1605 of the ARRA prohibits the use of these funds unless all iron, steel, and manufactured goods are produced in the United States. All iron and steel manufacturing processes must take place in the United States, except for metallurgical processes involving refinement of steel additives. There is no requirement for the origin of components and subcomponents of manufactured goods. Products listed at 48 CFR 25.104(a) have been determined to be unavailable in the United States and if required for the project may be purchased from foreign sources. No unauthorized use of foreign iron, steel, and/or manufactured goods will be allowed on this project.

1.2 REPORTS AVAILABLE TO THE CONTRACTOR

A. Geotechnical Report:
   1. Sub-surface investigation has been performed at the project site. This investigation was conducted, and a report obtained, solely for design purposes and is not a part of the Contract Documents.
   2. The use and interpretation of this information will be entirely the responsibility of the using party. The Owner is not responsible for variations in the sub-surface conditions. Bidders shall decide for themselves the character of the material to be encountered.
   3. The report of the subsurface soil investigation by an independent testing laboratory is available upon request from the Owner for use and reference during construction. Reference the geotechnical report by R&M Engineering dated December 15, 2010. Copies are available upon request.

B. Shielding Report:
   1. A report of the anticipated radiation shielding protection required for the project shall be completed prior to construction to confirm the extent of lead lining shown on the contract documents.

1.3 CONTRACTOR USE OF PREMISES

A. General: During the construction period the Contractor shall have full use of the premises for construction operations, including use of the site. The Contractor's use of the premises is limited only by the Owner's right to perform construction operations with its own forces or to employ separate contractors on portions of the project.

B. Work shall be performed in a manner that will not impose avoidable hardship, danger, or inconvenience to public or surrounding neighbors.

1.4 USE OF PREMISES

A. Use of Site: Confine operations to areas within Contract limits indicated. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed without written approval of Owner.
   1. Obtain written approval from Owner at least seven (7) working days in advance when scheduling Work outside limits of construction. Provide Owner an estimate of time needed to perform Work outside limits of construction.
   2. Cutting, capping, and reconnecting utility systems outside limits of construction shall be performed by Contractor, unless otherwise noted.
   3. Conform to all laws, ordinances, permits and regulations affecting the Work on site.
   4. Existing roads, streets, drives, parking lots, entrances and required fire exitways serving the premises shall be kept clear and available at all times for their intended use. These areas shall not be used for parking, staging or storage without the Owner’s written approval. Coordinate with Owner, and provide alternate routes for public and Owner access if normal routes are affected. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.
   5. Do not unreasonably encumber site with equipment, materials, or vehicles.
   6. Return all improvements on or about site and adjacent property which are not shown to be altered, removed or otherwise changed; to conditions which existed previous to starting performance under the Contract.
   7. Construction personnel will not at any time park in any Owner parking lot, on Owner property without Owner’s consent, and will not park on adjacent residential streets.

1.5 PARTIAL OWNER OCCUPANCY

A. General: The Owner reserves the right to occupy and to place and install equipment in completed areas of the building, prior to Substantial Completion provided that such occupancy does not interfere with completion of the Work. 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 local building officials prior to Owner occupancy.

3. Prior to partial Owner 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.

1.6 OWNER-FURNISHED ITEMS

A. The Owner will provide items indicated to be furnished by Owner in the Contract Documents. The Work includes receiving, unloading, handling, storing, protecting, and installing Owner-furnished products.
   1. The Owner will arrange and pay for delivery of Owner-furnished items in accordance with the Contractor's Construction Schedule, and will inspect deliveries for damage.
   2. If Owner-furnished items are damaged, defective or missing, the Owner will arrange for replacement. The Owner will also arrange for manufacturer's field services, and the delivery of manufacturer's warranties and bonds to the Contractor.
   3. The Contractor is responsible for designating the delivery dates of Owner-furnished items in the Contractor's Construction Schedule and for receiving, unloading and handling Owner-furnished items at the site. The Contractor is responsible for protecting Owner-furnished items from damage, including damage from exposure to the elements, and to repair or replace items damaged as a result of his operations.

1.7 MISCELLANEOUS PROVISIONS

A. By execution of this Contract, Contractor acknowledges review of proposed details and specifications and agrees to provide warranties and bonds for products and systems specified herein, detailed on drawings and as approved as a substituted or equal product or system in Section 01-2513.

B. No material containing asbestos shall be used in the construction of this project or incorporated into the completed work. Contractor shall provide certification that the building is asbestos free at the completion of construction, as required in Contract Closeout, Section 01-7700.

1.8 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.

C. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically 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. Execute cutting and patching to integrate elements of Work, uncover ill-timed, defective, and non-conforming Work, and provide samples for testing if required. Seal penetrations through floors, walls, and roofing.

1.9 DEFINITIONS AND EXPLANATIONS

A. Imperative language is used generally in the specifications. Except as otherwise indicated, requirements expressed imperatively are to be performed by the Contractor as if preceded by the phrase “The Contractor shall”.

B. The term “provide” means furnish and install, complete, and ready for intended use.
   1. Except as otherwise defined in greater detail, the term “furnish” means supply and deliver to the project site, including unloading, unpacking, inspecting, and storing until ready for receipt by Owner, installation, etc., as applicable.
   2. Except as otherwise defined in greater detail, the term “install” is used to describe operations at project site including assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations, as applicable.

C. The term “indicated” is used as cross-reference to graphics, notes or schedules on drawings, to other paragraphs or schedules in the specifications, and to similar means of recording requirements in contract documents. Where terms such as “shows”, “noted”, “schedules”, and “specified” are used in lieu of “indicated”, it is for purpose of helping reader locate cross-reference, and no limitations of location is intended.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

SECTION 01-2000
PRICE AND PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Procedural requirements for processing the following:
1. Schedule of Values.
2. Cash flow projections for the project.
3. Payment applications.
4. Payments at substantial completion.
5. Payment at final completion.
6. Identification of substitutions and alternatives in payment requests.
7. Accounting of Change Order amounts and allowances, and similar cost and pay-out related requirements.

1.2 SCHEDULE OF VALUES

A. General:
1. Prepare typed schedule on AIA Form G703-1992, in coordination with the preparation of the progress schedule.
2. Correlate the line items of the Schedule of Values with other administrative schedules and forms required for the work, including the following:
   a. Progress schedule.
   b. Payment request form.
   c. Listing of subcontractors.
   d. Schedule of allowances.
   e. Schedule of alternates.
   f. Listing of products and principal suppliers and fabricators.
   g. Schedule of submittals.
3. Provide breakdown of Contract Sum in sufficient detail to facilitate continued evaluation of payment requests and progress reports.
4. A breakdown of principal subcontract amounts will be required (several line items).
5. At Contractor's option, values may be rounded off to nearest whole dollar, but total must equal the Contract Sum.

B. Material/Fabrication Values: For each unit of work where payment requests will be made on account of materials or equipment purchased/fabricated/delivered but not yet installed, show "initial value" for payment request and "value added" for subsequent stage or stages of completion on that unit of work.

C. Time Coordination: In the coordination of initial submittals and other administrative "start-up" activities, submit the Schedule of Values to the Architect no later than 7 days before the initial payment application is to be submitted.

D. Listing: Arrange schedule with columns to indicate the generic name of the item, related specification sections, subcontractor, supplier/manufacturer/fabricator, Change Order (numbers) which have affected the value, dollar value of item, and percentage of Contract Sum (to nearest one-hundredth percent and adjusted to total 100 percent).

E. Schedule Updating:

1. Update and resubmit Schedule of Values whenever Change Orders affect the listing and whenever the actual performance of the work involves necessary changes of substance to the values previously listed.
2. Coordinate re-submittal times with progress reports and payment application.

1.3 PAYMENT APPLICATIONS

A. General:
   1. Except as otherwise indicated in the Contract Documents, comply with the procedures and requirements of the General Conditions, including the submittal of supporting documentation and waivers or releases of lien.
   2. Refer to General Conditions of the Contract, Supplementary Conditions for requirements concerning "retainage" by Owner on payment.
   3. Except as otherwise indicated, sequence of progress payments shall be made on a regular basis, and each must be consistent with previous applications and payments.

B. Payment Application Times: The period of construction work covered by each payment request is the period indicated in the General Conditions of the Contract and Supplementary Conditions.

C. Application Preparation:

   1. Payment Application Forms: AIA Document G702-1992 and Continuation Sheets.
   2. Except as otherwise indicated, complete every entry provided for on the form, including the notarization and execution by authorized persons.
   3. Incomplete applications shall be returned by the Architect without action.
   4. Entries must match current data of both the Schedule of Values and progress schedule and report.
   5. Listing must include amounts of Change Orders approved prior to the last day of the "period of construction" of the application.

D. Stored Materials: Include in Payment Application amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
   1. Provide certificate of insurance, evidence of transfer of title to Owner and consent of surety to payment, for stored materials.
   2. Provide supporting data that verifies amount requested, such as invoices.
   3. Provide summary of stored materials indicating:
      a. Materials previously stored and included in previous Payment Applications
      b. Work completed for this Payment Application utilizing previously stored materials.
      c. Additional materials stored with the Payment Application.
      d. Total materials remaining stored, including materials with the Payment Application.

E. Initial Payment Application: The following must be received by the Architect prior to submittal of the first payment application.
   1. Listing of subcontractors and principal suppliers and fabricators.
   2. Schedule of values.
   3. Progress schedule.
   4. Schedule of principal products.

5. Schedule of unit prices.
6. Schedule of submittals.
7. Listing of Contractor's staff assignments and principal consultants.
8. Copies of acquired building permits and similar authorizations and licenses from governing authorities for the current performance of the work.
9. Data needed by Owner to acquire insurance coverage required of the Owner.
10. Initial settlement survey and damage report, if required.
11. Initial progress report, including report of preconstruction meeting.

F. Application at Time of Substantial Completion:
   1. Following the issuance of the Architect's "Certificate of Substantial Completion", and also in part as applicable to prior certificates on portions of completed work as designated, a "special" payment application may be prepared and submitted by the Contractor.
   2. The principal administrative actions and submittals which must precede or coincide with such special applications are specified in the General Conditions, and elsewhere in the Contract Documents.
   3. Those specifically related to the application can be summarized as follows, but not limited to these:
      a. Occupancy permits and similar approvals or certifications by governing authorities and franchised services, assuring Owner's full access and use of the completed work.
      b. Warranties, guarantees, maintenance agreements and similar provisions of the Contract Documents.
      c. Test/adjust/balance records, maintenance instructions, meter readings, start-up performance reports, and similar change-over information germane to the Owner's occupancy, use, operation and maintenance of the completed work.
      d. Final cleaning of the work.
      e. Application for reduction (if any) of retainage, and Consent of Surety.
      f. Advice to Owner on coordination of shifting insurance coverage, including proof of extended coverage as required.
      g. Final progress photographs, if required.
      h. Listing of incomplete work (Punch List) recognized to be completed by the Contractor, as exceptions to the Architect's Certificate of Substantial Completion.

G. Final Payment Application:
   1. The administrative actions and submittals which must proceed or coincide with submittal of the final payment application can be summarized as follows, but not necessarily limited to these:
      a. Completion of project closeout requirements.
      b. Completion of items specified for payment application at time of substantial completion (regardless of whether such application was made).
      c. Assurance, satisfactory to Owner, that unsettled claims will be settled and that work not actually completed and accepted will be completed without undue delay.
      d. Transmittal of required project construction record documents and materials to Owner.
      e. Certified property survey.
      f. Proof, satisfactory to Owner, that taxes, fees and similar obligations of the Contractor have been paid.
      g. Removal of temporary facilities, services, surplus materials, rubbish and

similar provisions.

h. Change over of door locks and other Contractor access to Owner's property.

i. Consent of Surety for Final Payment.

H. Application Transmittal:

1. Submit number of copies to be verified at first Owner/Architect/Contractor meeting. Include with one copy waivers of lien and similar attachments.
2. Transmit each copy with a transmittal form listing those attachments, and recording appropriate information related to the application in a manner acceptable to the Architect.
3. Transmit to Architect to ensure receipt within 24 hours.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

SECTION 01-2100
ALLOWANCES

PART 1 - GENERAL

1.1 SUMMARY

A. Requirements for the following allowances:

1. Lump-sum cash allowances.

B. Certain requirements of the Work related to each allowance are shown and specified in the Contract Documents.

C. The allowance has been established in lieu of additional requirements for that work; further requirements (if any) will be issued by Change Order.

1.2 SELECTING AND PURCHASING

A. At the earliest feasible date after the award of Contract, the Architect/Engineer must be advised of the scheduled date when the final selection and purchase of each product or system described by each allowance will be accomplished in order to avoid delays in the performance of the Work.

B. Obtain and submit proposals for the work of each allowance, as requested by the Architect/Engineer for use in making final selections. Include whatever recommendations for selection that may be important for proper performance of the Work.

C. Purchase the products and systems as specifically selected (in writing) by the Architect/Engineer.

D. Submit proposals and recommendations for the purchase of products or systems described by each allowance in accordance with "Change Order Requirements" specified in this Section.

1.3 CASH ALLOWANCE

A. Comply with the General Conditions for the cash allowances enumerated below.

B. Schedule of Lump-Sum Allowances (to be carried by the Construction Manager):

1. Lump-Sum Allowance: Allow the lump-sum of $25,000 for the purchase and delivery of Landscaping to be specified and detailed at a later date.
2. Lump-Sum Allowance: Allow the lump-sum of $50,000 for the purchase and delivery of Interior and Exterior Signage to be specified and detailed at a later date.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

SECTION 01-2513
PRODUCT SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Requirements for requesting approval of proposed substitutions.

B. The requirements of this section govern the use of "Substitution Request Form - Section 01-2513.13".

1.2 SUBSTITUTION CLAUSE

A. When a material, article, or piece of equipment is identified on the drawings or in the specifications by reference to manufacturer's or vendor's name, trade name, catalog number, or the like, it is only identified to establish a standard. Within the specifications, two other manufacturers are listed as "approved equals" and are not required to be submitted for additional approval. A substitution request shall be made in the event there is a material, article, or piece of equipment of other manufacturers or vendors that will perform, equally or better, the duties imposed by the general design. The request will then be considered equally acceptable provided the proposed items are, in the opinion of the architect, of equal substance, appearance, and function. These items shall not be purchased or installed by the Contractor without the Architect's written approval. As part of the approval process the proposed brand name products must meet ARRA requirements before concurring that they are otherwise acceptable. Therefore bidders and contractors shall submit a certification that proposed substitutes and equals meet ARRA requirements with any such submittal.

1.3 LIMITATIONS ON SUBSTITUTIONS

A. Substitutions will not be considered unless the "Substitution Request Form - Section 01-6325" attached in this Project Manual is used and the requirements of this section and Section 01-6325 are fully complied with.
   1. Other types of forms are not acceptable.

B. Substitutions will not be considered when indicated on shop drawings or product data submittals without separate formal request complying with "submittal procedures" specified in this section.

C. Substitutions will not be considered unless submitted through the General Contractor.

D. Additional studies, investigations, submittals, redesign and/or analysis by the Architect/Engineer caused by the requested substitutions shall be paid by the Contractor at no expense to the Owner.

E. Substitute products shall not be ordered or installed without written acceptance.

F. Only one request for substitution for each product will be considered. When substitution is not accepted by the Architect, provide the specified product.

G. Architect will determine the acceptability of all substitutions.

1.4 REQUESTS FOR SUBSTITUTIONS

A. Contractor's Representation:
   1. Request for substitution constitutes a representation that the Contractor:
      a. Has investigated the proposed product and has determined; that it is equal to or superior in all respects to the specified product.
      b. Will provide same type of warranty for substitution as for specified product.
         1) Contractor's warranty shall be in writing guaranteeing all substituted products have same or superior performance as the product specified.
      c. Will coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.
      d. Waives all claims for additional costs related to substitutions which consequently become apparent.
      e. Has thoroughly investigated the proposed substitute to determine if license fees and royalties are pending on the proposed substitute, for compliance with General Conditions of the Contract.
      f. That the proposed substitute meets ARRA requirements.
   2. Request for substitution constitutes a representation that the cost data is complete and includes all related cost under his Contract, but excludes any approved Architect's design fees required by substitution.

B. Requests for substitutions shall be submitted on "Substitution Request Form - Section 01-2513.13" within one week of the designated bid date. Legible copies of this form shall be made as required for Contractor's submittals. Each submittal request form shall be complete with data substantiating compliance of proposed substitution with requirements of Contract Documents.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

SECTION 01-2513.13
SUBSTITUTION REQUEST FORM

ARCHITECT/ENGINEER WILL NOT REVIEW THIS FORM UNLESS COMPLETELY FILLED OUT INCLUDING SALIENT CHARACTERISTICS COMPARISON.

Project: Replacement Hospital for Wrangell Medical Center, Wrangell, Alaska

Submit to: Julia M. Covington
Johnson Johnson Crabtree Architects P.C.
Nashville, TN 37204
Fax: 615-837-0657
Email: jcovington@jjca.com

Date Submitted:_____

Specification Section No. and Title_____ - _____

Specified Item:_____

Paragraph No. (Example 2.3.A.)_____

Proposed Substitute:_____

Substitute Manuf. website/Direct link to product:_____

1. How will dimensions, gauges, and weights indicated in Contract Documents be changed by proposed substitute?_____
   _____
   _____
2. How will wiring, piping, and duct work indicated in Contract Documents by changed by proposed substitute?_____
   _____
   _____
3. How will other trades be effected by proposed substitute?_____
   _____
   _____
4. How will the construction schedule be effected by the proposed substitute?_____
   _____
   _____
5. How will the proposed substitute change unit costs? Circle and complete one below: No change. Cost will decrease by _____. Cost will increase by _____.

Provide breakdown for cost changes on attached sheet.

6. How will the manufacturers warranty of proposed substitute differ from warranty indicated in Construction Documents?

   _____
   _____
   _____

7. Provide a point-by-point comparison of the important salient characteristics of proposed substitute against the specified item. Attach additional pages as needed. Do not leave this section blank or use words like “no difference” or “None”.

Specified Item	Proposed Item
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

8. Subcontractor Company Name: _____

   Company Representative: _____

   Telephone Number_____ email address _____

9. The undersigned makes the following certifications:
   a. The proposed substitution has been fully investigated and determined to have overall performance and longevity equal or superior to the specified product.
   b. That cost data is complete and that no claim for additional cost will be made after Substitution Request is accepted.
   c. That coordination, installation and changes associated with substitution will be complete.

General Contractor Company Name:_____

CompanyRepresentative:_____

Address:_____

Telephone Number_____ Fax Number_____

Signature & Date:_____

10. Architects Acceptance

Accepted_____ Accepted as noted _____ Rejected (See comment below)_____
Comment_____
_____
_____
_____

Architect' Signature & Date:_____

SECTION 01-2527
WEATHER DELAYS

PART 1 - GENERAL

1.1 EXTENSIONS OF CONTRACT TIME

A. If the basis exists for an extension of time in accordance with paragraph 8.3 of the Conditions, an extension of time on the basis of weather may be granted only for the number of Weather Delay Days in excess of the number of days listed as the Standard Baseline for that month.

1.2 STANDARD BASELINE FOR AVERAGE CLIMATIC RANGE

A. If he Owner has reviewed weather data available from the National Oceanic and Atmospheric Administration (NOAA) and determined a Standard Baseline of average climatic range for the State of Alaska.

B. Standard Baseline shall be regarded as the normal and anticipated number of calendar days for each month during which construction activity shall be expected to be prevented and suspended because of adverse weather. Suspension of construction activity for the number of days each month as listed in the Standard Baseline is included in the Work and is not eligible for extension of Contract Time.

1.3 ADVERSE WEATHER AND WEATHER DELAY DAYS

A. Adverse weather is defined as the occurrence of one or more of the following conditions which prevents exterior construction activity or access to the site within twenty-four (24) hours

1. Precipitation (rain, snow, or ice) in excess of one-tenth inch (0.10") liquid measure.
2. Temperatures which do not rise above 32 degrees F by 10:00 a.m
3. Temperatures which do not rise above that specified for the day's construction activity by 10:00 a.m., if any is specifie
4. Sustained wind in excess of twenty-five (25) m.p.h.
5. Standing snow in excess of one inch (1.00").

B. Adverse weather may include, if appropriate, "dry-out" or "mud" days:

1. For rain days above the standard baseline.
2. Only if there is a hindrance to site access or sitework, such as excavation, backfill, and footings; and
3. At a rate no greater than 1 make-up day for each day or consecutive days of rain beyond the standard baseline that total 1.0 inch or more, liquid measure, unless specifically recommended otherwise by the Designer.
4. A weather delay day may be counted if adverse weather prevents work on the project for fifty percent (50%) or more of the Contractor's scheduled work day, including a weekend day or holiday if Contractor has scheduled construction activity that day.

1.4 DOCUMENTATION AND SUBMITTALS

A. Submit daily jobsite work logs showing which and to what extent construction activities have been affected by weather on a monthly basis.

B. Submit actual weather data to support claim for time extension obtained from nearest NOAA weather station or other independently verified source approved by designer at beginning of project.

C. Use Standard Baseline data provided in this section when documenting actual delays due to weather in excess of the average climatic range.

D. Organize claim and documentation to facilitate evaluation of a basis of calendar month periods, and submit in accordance with the procedures for claims established in paragraph 4.3 of the Conditions.

E. Of an extension of the Contract Time is appropriate, it shall be effected in accordance with the provisions of Article 7 of the Conditions, and the applicable General Requirements.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

SECTION 01-2600
CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Procedural requirements for considering and processing Change Orders.

B. Related Requirements:
1. Agreement: The amounts of established unit prices.
2. Conditions of the Contract:
   a. Methods of determining cost or credit to Owner resulting from changes in Work made on a time and material basis.
   b. Contractor's claims for additional costs.
3. Section 01-2100: Allowances.
4. Section 01-2000: Price And Payment Procedures
5. Section 01-7839: Project Record Documents.

C. Forms for Changes: See Section 00-5000.

1.2 PROPOSAL PROCEDURES

A. Owner or Architect may initiate a potential change by submitting a Proposal Request or Supplemental Instructions to Contractor. Request will include the following:
1. Detailed description of the Change, Products, and location of the change in the Project.
2. Supplementary or revised Drawings and Specifications.
3. The projected time span for making the change and a specific statement as to whether overtime work is, or is not, authorized.
4. A specific period of time during which the requested price will be considered valid.
5. Such request is for information only, and is not an instruction to execute the changes, or to stop Work in progress.

B. Contractor may initiate a request for changes by submitting a written notice to Architect, containing the following:
1. Description of the proposed changes.
2. Statement of the reason for making the changes.
3. Statement of the effect on the Contract Sum and the Contract Time.
4. Statement of the effect on the work of separate contractors.
5. Documentation supporting any change in Contract Sum or Contract Time, as appropriate.

C. Provide full written data required to evaluate changes.
1. Maintain detailed records of work performed on a time-and-material/force account basis.
2. Provide full documentation to Architect upon request.

D. Designate in writing the member of Contractor's organization:
1. Who is authorized to accept changes in the Work.
2. Who is responsible for informing others in the Contractor's organization of the authorization of changes in the Work.

E. Owner will designate in writing the person who is authorized to execute Change Orders.

1.3 CONSTRUCTION CHANGE DIRECTIVES

A. In absence of total agreement on the terms of a Change Order, the Architect may prepare and issue a Construction Change Directive directing a change in the Work, for subsequent inclusion in a Change Order.
   1. Construction Change Directive will describe changes in the Work and describe the method of determining any change in the Contract Sum or Contract Time, or both.
   2. Construction Change Directive will be signed by Owner and Architect.

B. Upon receipt of a Construction Change Directive, Contractor shall do the following:
   1. Promptly proceed with the change in the Work involved.
   2. Promptly advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

C. A Construction Change Directive signed by the Contractor indicates the agreement of the Contractor therewith, including adjustment in Contract Sum and Contract Time or the method for determining them.
   1. Such agreement shall be effective immediately and shall be recorded as a Change Order.
   2. If Contractor does not respond promptly or disagrees with the Construction Change Directive, he shall comply with General Conditions.

D. A Construction Change Directive shall be processed in compliance with requirements of the General Conditions.

1.4 DOCUMENTATION OF PROPOSALS AND CLAIMS

A. Support each quotation for a lump-sum proposal, and for each unit price which has not previously been established, with sufficient substantiating data to allow Architect to evaluate the quotation.

B. On request provide additional data to support time and cost computations:
   1. Labor required.
   2. Equipment required.
   3. Products required:
      a. Recommended source of purchase and unit cost.
      b. Quantities required.
   4. Taxes, insurance and bonds.
   5. Credit for work deleted from Contract, similarly documented.
   6. Overhead and profit, for subcontractor and General Contractor separately.
   7. Justification for any change in Contract Time.

C. Support each claim for additional costs, and for work done on a time-and-material/force account basis, with documentation as required for a lump-sum proposal, plus the following additional information:
   1. Name of the Owner's authorized agent who ordered the Work, and date of the order.
   2. Dates and hours work was performed, and by whom.
   3. Time record, summary of hours worked, and hourly rates paid.

4. Receipts and invoices for:
   a. Equipment used, listing dates and times of use.
   b. Products used, listing of quantities.
   c. Subcontracts.
   d. Overhead and Profit, Taxes, Insurance.

D. Document requests for substitutions for Products as specified elsewhere in Division 1.

1.5 PREPARATION OF CHANGE ORDERS

A. Change Order will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change.

B. Change Order will provide an accounting of the adjustment in the Contract Sum and in the Contract Time.

1.6 LUMP-SUM/FIXED PRICE CHANGE ORDER

A. Content of Change Orders will be based on, either:
   1. Architect's Proposal Request and contractor's responsive Proposal as mutually agreed between Owner and Contractor.
   2. Contractor's Proposal for a change, signed by the Contractor, as recommended by Architect.

B. Owner and Architect will sign and date the Change Order as authorization for the Contractor to proceed with the changes, after the Contractor has signed the Change Order.

1.7 TIME AND MATERIAL/FORCE ACCOUNT CHANGE ORDER/CONSTRUCTION CHANGE AUTHORIZATION

A. Architect or Owner will issue a Construction Change Directive directing Contractor to proceed with the changes.

B. At completion of the change, Contractor shall submit itemized accounting and supporting data as provided in the Article "Documentation of Proposals and Claims" of this Section.

C. Architect will sign and date the Change Order to establish the change in Contract Sum and in Contract Time.

D. Owner and Contractor will sign and date the Change Order to indicate their agreement therewith.

1.8 CORRELATION WITH CONTRACTOR'S SUBMITTALS

A. Periodically revise Schedule of Values and Request for Payment forms to record each change as a separate item of Work, and to record the adjusted Contract Sum.

B. Periodically revise the Construction Schedule to reflect each change in Contract Time.
   1. Revise sub-schedules to show changes for other items of work affected by the changes.

C. Upon completion of Work under a Change Order, enter pertinent changes in Record Documents.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOTE USED.

END OF SECTION

SECTION 01-3119
PROJECT MEETINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Contractor's Responsibilities:
1. Schedule and administer meetings throughout duration of work.
2. Prepare agenda for meetings.
3. Distribute written notice of each meeting seven working days in advance of meeting date.
4. Make physical arrangements for meetings.
5. Preside at meetings.
6. Record the minutes; include all significant proceedings and decisions.
7. Reproduce and distribute copies of minutes within three working days after each meeting.
8. Provide one copy to:
   a. All participants in the meeting, including the Architect.
   b. All parties affected by decisions made at the meeting.

B. Participants:
1. Qualified representative of Contractors, Subcontractors, and Suppliers authorized to act on behalf of the parties they represent.
2. Owner's Representative at their option.

1.2 PRE-CONSTRUCTION MEETING

A. Schedule meeting within the early stages of Construction as determined by the General Contractor.

B. Suggested Agenda: Prepare written material, distribute lists, and discuss the following:
1. Identification of major Subcontractors and Suppliers.
2. Projected construction schedules.
3. Critical work sequencing.
4. Major equipment deliveries and priorities.
5. Project coordination, including designation of responsible persons.
6. Procedures for, and processing of:
   a. Field decisions.
   b. Proposal requests.
   c. Submittals.
   d. Change orders.
   e. Applications for payments.
7. Adequacy of distribution of Contract Documents.
8. Procedures for Maintaining Record Documents.
9. Use of premises:
   a. Office, work and storage areas.
   b. Owner's requirements.
   c. Construction facilities, construction aids, and controls.
   d. Procedures for preventing interaction of hazardous roof materials with HVAC intakes.

e. Temporary utilities.
f. Safety and first aid procedures.
g. Security procedures.
h. Smoking policy.
i. Housekeeping procedures.
j. Working days/hours.

1.3 PROGRESS MEETINGS

A. Schedule regular monthly meetings and as necessary, schedule additional meetings.

B. Suggested Agenda:
1. Review and approval of minutes of previous meeting.
2. Review of work progress since previous meeting.
3. Field observations, problems, conflicts.
4. Problems which impede construction schedule.
5. Review of off-site fabrication, delivery schedules.
6. Corrective measures and procedure required to regain projected schedule.
7. Revisions to construction schedule.
8. Plan progress and schedule for succeeding work period.
9. Coordination of schedules.
10. Review submittal schedules; expedite as required.
11. Maintenance of quality standards.
12. Review proposed changes for:
    a. Effect on construction schedule and on completion date.
    b. Effect on other contracts of the Project.
13. Other business.

1.4 PRE-INSTALLATION MEETINGS

A. Notify Architect ten working days before meeting date.

B. Envelope and Roofing Pre-Installation Conference:
1. Prior to starting roofing and exterior envelope work, the Contractor shall set up a job site meeting with the following attendees:
    a. Contractor’s Project Manager and Project Superintendent
    b. Architect’s Representative
    c. Subcontractors responsible for portions of the Work associated with the building envelope and roof, including the following as applicable to the project: Masonry, fiber cement siding, exterior studs, exterior sheathing and vapor retarder, windows, through-wall flashing, sealants, roofing (insulation, lightweight concrete, roofing material), metal flashing/ fascia, roof drains, mechanical roof equipment, and any other subcontractors the general contractor feels need to be present for the discussion.
    d. Manufacturers representatives for portions of the Work associated with the building envelope and roof, including the following as applicable to the project: Brick, fiber cement siding, exterior studs, exterior sheathing, flashing, sealants, roofing, and any other subcontractors the General Contractor feels need to be present for the discussion.

2. Agenda: Review submittals, project specifications, pertinent details, testing requirements, and design intent.

3. Recording: The Contractor shall record discussions of conference and decisions reached, and furnish copy of record to each attendee.

C. Door Hardware Pre-Installation Conference:
   1. Prior to starting door hardware installation, the General Contractor shall set up a job site meeting with the following attendees:
      a. General Contractor's Project Manager and Project Superintendent
      b. Architect's Representative
      c. Subcontractors responsible for portions of the Work associated with the door hardware installation, including the following as applicable to the project: Door Hardware, Automatic Operators, Electrical and any other subcontractors the General Contractor feels need to be present for the discussion
      d. Owner's Representatives responsible for the installation and coordination of the door hardware, including the following as applicable to the project: Low voltage, Security, Keying, etc
   2. Agenda: Review door function and design intent of specialized doors and parties responsible for each component necessary.
   3. Recording: The Contractor shall record discussions of conference and decisions reached, and furnish copy of record to each attendee.

D. Where elsewhere required in individual Specification Sections, schedule a pre-installation meeting at the job-site prior to starting the work of the Section.
   1. Require attendance of entities directly affecting, or affected by, the work of the Section.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

SECTION 01-3200
CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. This section includes administrative and procedural requirements for documenting the progress of construction during performance of the work, including the following:
   1. Contractor's construction schedule.
   2. Submittals Schedule
   3. Digital photographs of job site conditions.

1.2 SUBMITTALS

A. Follow Section 01-3323 for making construction submittals.
   1. Contractor's Construction Schedule: Submit initial schedule, large enough to show entire schedule for entire construction period.
   2. Contractor's Submittal Schedule: Submit intended submittal schedule for entire project.

B. Follow sections 01-7700, 01-7823 and 01-7833 for making closeout submittals
   1. Construction Photographs: Submit digital electronic files as a Project Record Document. Identify electronic media with dates photographs were taken.

1.3 QUALITY ASSURANCE

A. Scheduling Consultant Qualifications: An experienced specialist in scheduling and reporting.

B. Prescheduling Conference: Conduct conference at project site to review methods and procedures related to the Contractor's Construction Schedule, including, but not limited to, the following:
   1. Review software limitations and content and format for reports.
   2. Verify availability of qualified personnel needed to develop and update schedule.
   3. Discuss constraints, including phasing, work stages and area separations.
   4. Review delivery dates for Owner-furnished products.
   5. Review schedule for work of Owner's separate contracts.
   6. Review time required for review of submittals and resubmittals.
   7. Review requirements for tests and inspections by independent testing and inspecting agencies.
   8. Review time required for completion and startup procedures.
   9. Review and finalize list of construction activities to be included in schedule.
   10. Review submittal requirements and procedures.
   11. Review procedures for updating schedule.

1.4 COORDINATION

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

B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
   1. Secure time commitments for performing critical elements of the work from parties involved.
   2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
   1. Coordinate Submittals Schedule with list of subcontractors, the Schedule of Values, and Contractor's Construction Schedule.
   2. Initial Submittal: Submit concurrently with preliminary construction schedule. Include submittals required during the first 60 days of construction. List those required to maintain orderly progress of the work and those required early because of long lead time for manufacture or fabrication.
      a. At Contractor's option, show submittals on the Preliminary Construction Schedule, instead of tabulating them separately.
   3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Procedures: Comply with procedures contained in AGC's "Construction Planning and Scheduling."

B. Time Frame: Extend schedule from date established for commencement of the work to date of Final Completion.
   1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

C. Activities: Treat each separate area as a separate numbered activity for each principal element of the work. Comply with the following:
   1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
   2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
   3. Submittal Review Time: Include review and resubmittal times indicated in Division 1 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
   4. Startup and Testing Time: Include not less than seven days for startup and testing.
   5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's and Construction Manager's administrative procedures necessary for certification of Substantial Completion.

6. Punch List and Final Completion: Include not more than 30 days for punch list and final completion.

D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the work is affected.
   1. Phasing: Arrange list of activities on schedule by phase.
   2. Work Under More Than One Contract: Include a separate activity for each contract.
   3. Work by Owner: Include a separate activity for each portion of the work performed by Owner.
   4. Owner-Furnished Products: Include a separate activity for each product with delivery date. Delivery dates indicated stipulate the earliest possible delivery date.
   5. Work Restrictions: Show the effect of the following items on the schedule:
      a. Partial occupancy before Substantial Completion.
      b. Use of premises restrictions.
      c. Seasonal variations.
      d. Environmental control.
   6. Work Stages: Indicate important stages of construction for each major portion of the work, including, but not limited to, the following:
      a. Subcontract awards.
      b. Submittals.
      c. Purchases.
      d. Mockups.
      e. Fabrication.
      f. Sample testing.
      g. Deliveries.
      h. Installation.
      i. Tests and inspections.
      j. Adjusting.
      k. Curing.
      l. Startup and placement into final use and operation.
   7. Area Separations: Identify each major area of construction for each major portion of the work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
      a. Structural completion.
      b. Permanent space enclosure.
      c. Completion of mechanical installation.
      d. Completion of electrical installation.
      e. Substantial Completion.

E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.

F. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis to demonstrate the effect of the proposed change on the overall project schedule.

G. Computer Software: Prepare schedules using a program that has been developed specifically to manage construction schedules.

2.3 PRELIMINARY CONSTRUCTION SCHEDULE

A. Bar-Chart Schedule: Submit preliminary horizontal bar-chart-type construction schedule within seven days of date established for commencement of the work.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 60 days of construction. Include skeleton diagram for the remainder of the work and a cash requirement prediction based on indicated activities.

2.4 CONTRACTOR'S CONSTRUCTION SCHEDULE- CRITIAL PATH METHOD (CPM)

A. CPM Schedule: Prepare Contractor's Construction Schedule using a CPM network analysis diagram.
   1. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
   2. Use "one workday" as the unit of time.

B. CPM Schedule Preparation: Prepare a list of all activities required to complete the work.
   1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
      a. Preparation and processing of submittals.
      b. Purchase of materials.
      c. Delivery.
      d. Fabrication.
      e. Installation.
      f. Principal events of activity
      g. Immediate preceding and succeeding activities.
      h. Early and late start dates
      i. Early and late finish date
      j. Activity duration in workday
      k. Total float or slack time
   2. Format: Mark the critical path.

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 early and late start dates.
   3. Changes in early and late finish dates.
   4. Changes in activity durations in workdays.
   5. Changes in the critical path.
   6. Changes in total float or slack time.
   7. Changes in the Contract Time.

2.5 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at project site.
   1. List of subcontractors at project site.
   2. List of separate contractors to project site.

3. Approximately count of personnel at project site.
4. High and low temperatures and general weather conditions.
5. Accidents.
6. Meetings and significant decisions.
7. Unusual events (refer to special reports).
8. Stoppages, delays, shortages, and losses.
9. Meter readings and similar recordings.
10. Emergency procedures.
11. Orders and requests of authorities having jurisdiction.
12. Change Orders received and implemented.
13. Construction Change Directives received.
14. Services connected and disconnected.
15. Equipment or system tests and startups.
16. Partial Completions and occupancies.
17. Substantial Completions authorized.

B. Material Location Reports: At monthly intervals, prepare a comprehensive list of materials delivered to and stored at project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from project site.

C. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare a detailed report. Submit with a request for information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.6 SPECIAL REPORTS

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

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

2.7 PHOTOGRAPHIC MEDIA

A. Digital Images: Provide images in PDF format.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor to provide planning, evaluation, and reporting using CPM scheduling.
   1. Scheduling to be performed by skilled personnel with experience in CPM scheduling and reporting techniques.
   2. The individual with scheduling responsibility shall attend all meetings related to project progress, alleged delays, and time impact.

B. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
   1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
   2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
   3. As the work progresses, indicate Actual Completion percentage for each activity.

C. Distribution: Distribute copies of approved schedule to Architect, Construction Manager, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
   1. Post copies in project meeting rooms and temporary field offices.
   2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the work and are no longer involved in performance of construction activities.

3.2 CONSTRUCTION PHOTOGRAPHS

A. Preconstruction Photographs: Before starting construction, take four color photographs of project site and surrounding properties from different vantage points, plus interior photographs as directed by Architect. Show existing conditions adjacent to property and existing interior conditions.

END OF SECTION

SECTION 01-3323
SHOP DRAWINGS, PRODUCT DATA, SAMPLES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Procedures for processing:
   1. Shop Drawings
   2. Product Data
   3. Office Samples
   4. Mock-up Samples
   5. Certificate of Compliance

B. See Section 01-3200 for Submittal Schedule procedures.

C. See sections 01-7700, 01-7823 and 01-7833 for making closeout submittals.

1.2 GENERAL PROCEDURES

A. The approval of submittals does not constitute a Change Order.

B. All products shall be submitted with certification that the items meet ARRA Requirements.

C. All items shall be submitted under Construction Manager's or Component Contractor's transmittal letter. The transmittal letter shall include the following information. If the following information is not included, the submittal will be returned un-reviewed for clarification.
   1. Project by title and Architect's project number.
   2. Contractor's contract number.
   3. Work and products by Specification Section, Article number and type (Product data, shop drawings, certification, etc.).
   4. All requirements for submittals specified in this section and individual sections of the Project Manual shall be complied with; partial submittals are not acceptable and will be returned by the Architect.

D. Resubmittals: When Architect requires that a submittal be "resubmitted", comply with requirements of this section.
   1. Identify changes made since the previous submittal.

E. Notify Architect in writing at time of submittal, of any deviations from the requirements of Contract Documents.

F. Make all submittals far enough in advance of scheduled dates for installation to provide sufficient time for reviews, for securing necessary approvals, for possible revisions and resubmittals, and for placing orders and securing delivery.
   1. Architect's Review Time: In scheduling, allow at least 10 working days for Architect's review. (This review time shall apply to Architect's initial review, and allow at least 10 working days to review any subsequent required revision or resubmittal.)

2. Delays caused by the tardiness of the Contractor in preparing and forwarding of submittals (including failure to include time for possible revisions and resubmittals) will not be an acceptable basis for extension of the Contract completion date or for consideration of alternate products which do not meet the specified requirements of this Project Manual.

G. Fabricating products which require submittals to be approved by Architect before Architect approves and returns the submittals to Contractor shall be at Contractor's risk.

H. Starting work which requires submittals to be approved by Architect before Architect approves and returns the submittals to Contractor shall be at Contractor's risk.

I. Where used in the Contract Documents, the words "or equal" shall be defined as "refer to substitution requirements" specified in Section 01-2513.

1.3 SHOP DRAWINGS

A. Reproduction of any portion of the Architect's Construction Documents for use as submittals for shop drawings is not acceptable, such submittals will be returned unreviewed.

B. Submit shop drawings in a clear and thorough manner.
1. Title each drawing with Project name and Architect's project number.
2. Identify each element of drawings by reference to sheet number and detail, schedule, or room number of Contract Documents.

C. Identify the following:
1. Requirements of the individual section of Project Manual.
2. Field measurements.
3. Field construction criteria.
4. Relation to adjacent or critical features of the Work or products.
5. Conformance of submittal with requirements of Contract Documents.

D. Shop drawings shall be stamped and signed by Contractor before submitting to Architect. Certify compliance with requirements of Contract Documents. If submittals from the Contractor are marked anything except "approved" or "approved as noted," the submittal will be returned and not checked by the Architect.
1. The contractor's stamp shall contain a line to be filled in to indicate the applicable specification section(s) of the particular submittal. Submittals received without this information included will be returned without action.

E. Seismic Information: Include calculations showing the adequacy of the item, represented by the Shop Drawing, to resist the expected vertical and lateral forces as indicated.

F. Fabricating products or beginning the work before shop drawings are approved by Architect and returned to Contractor shall be at Contractor's risk.

G. Number of Copies Required: Submit the number which are required to be returned plus two copies which will be retained by the Architect.

1.4 PRODUCT DATA

A. Submit only pages which are pertinent.
   1. Mark each copy of standard printed data to identify pertinent products, referenced to Specification Section and Article number.
   2. Show reference standards, performance characteristics, and capacities; wiring and piping diagrams and controls; component parts; finishes; dimensions; and required clearances.
   3. Provide current safety data sheets for products and materials which are hazardous or potentially hazardous to handle and install in the project. A copy of the data sheets shall be on file in job office for use by employees on the job site.

B. Modify manufacturer's standard schematic drawings and diagrams to supplement standard information and to provide information specifically applicable to the Work. Delete information not applicable.

C. Each set of manufacturer's product data shall be stamped and signed by Contractor before submitting to Architect to certify compliance with requirements of contract Documents.

D. Number of Copies Required: Submit the number which are required to be returned plus two copies which will be retained by the Architect.

1.5 OFFICE SAMPLES

A. Submit full range of manufacturer's standard finishes except when more restrictive requirements are specified, indicating colors, textures, and patterns, for Architect's selection.

B. Submit samples to illustrate functional characteristics of products, including parts and attachments.

C. Approved samples which may be used in the Work are indicated in the Specification section.

D. Label each sample with identification required for transmittal letter.

E. Number Required: Submit the number which are required to be returned plus two copies which will be retained by the Architect.

1.6 MOCK-UP SAMPLES

A. Where mock-up samples and similar samples are indicated in the individual specifications section, comply with requirements for "Office Samples", and process transmittal forms for mock-ups to provide a record of activity.

1.7 MOCK-UPS

A. Exterior Building Mock-up: Before exterior finishes are started and Pre-installation Conference for Envelope and Roofing is held, provide an exterior mock-up for Owner and Architect review and approval of all exterior finish elements, materials and

construction manner. Size mock-up to be approximately 6' x 10', of layout provided by Architect. Construct mock-up as detailed in the Contract Documents.

1. Mock-up to incorporate all finish materials and specific details, such as bond, control joints, reveals, etc.
2. Mock-up to incorporate a typical opening with all waterproofing provisions shown in contract documents, such as the subsill pan. Flashing, etc.
3. Owner will test the mock-up panel assembly for moisture infiltration with hose test prior to construction of the entire envelope. Any failures will be discussed and resolved prior to incorporation into the building.
4. Contractor to schedule building of mock-up to allow for review and testing and not impact schedule.
5. Mock-up to be maintained on-site until building exterior is complete. Keep mock-up clean untilled removed from site, coordinate time of removal with Architect.

1.8 CERTIFICATIONS OF COMPLIANCE

A. Contractor shall submit "Certificates of Compliance" certifying that all materials used in the Work comply with all specified provisions thereof.
   1. Submit in the form of a letter or company standard forms.
   2. Include data or dates of testing and results of testing.

1.9 TEST REPORTS

A. Test reports certified by an independent testing laboratory must be made available upon request by Architect.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

SECTION 01-4000
QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

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

B. See Section 01-4529 and the Drawings for specific test and inspection requirements.

1.2 DEFINITIONS

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

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

C. Mockups: Full-size, physical example assemblies to illustrate finishes and materials. Mockups are used to verify selections made under Sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Mockups establish the standard by which the Work will be judged.
   1. See Section 01-3323 for additional requirements.

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

1.3 DELEGATED DESIGN

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
   1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Submittals: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement, signed and sealed by the responsible design

professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.4 REPORTS AND DOCUMENTS

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

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

1.5 QUALITY ASSURANCE

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

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance.

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

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

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

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

C. Testing Agency Qualifications: An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed.

1.6 QUALITY CONTROL

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

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

C. Special Tests and Inspections: Owner will engage a testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner.
   1. See Section 01-4529 for code compliance testing requirements.
   2. Testing agency will notify Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
   3. Testing agency will submit a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
   4. Testing agency will submit a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
   5. Testing agency will interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
   6. Testing agency will retest and reinspect corrected work.

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

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

F. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
   1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
   2. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
   3. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
   4. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
   5. Do not perform any duties of Contractor.

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

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

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
   1. Provide materials and comply with installation requirements specified in other Sections of these Specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.

2. Comply with the Contract Document requirements for Division 1 Section "Cutting and Patching."

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

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

END OF SECTION

SECTION 01-4517
UNCOVERING AND CORRECTION OF WORK

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. The requirements of Section 01-7329 Cutting and Patching form a part of this section and must be complied with.

1.2 UNCOVERING OF WORK

A. If the Contract Documents, laws, ordinances, rules, regulations or orders of any Public Authority having jurisdiction require any portion of the Work to be inspected, the Contractor shall give the Architect timely notice of its readiness so that the Architect may observe such inspections.

B. If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the Architect, be uncovered for the Architect's observation and be replaced at the Contractor's expense without change in the Contract Time.

C. If a portion of the Work has been covered which the Architect has not specifically requested to observe prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor.
   1. If such Work is in accordance with Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be charged to the Owner.
   2. If such Work is not in accordance with Contract Documents, the Contractor shall pay such costs unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

1.3 CORRECTION OF WORK

A. The Contractor shall promptly correct the Work rejected by the Architect and/or the Public Authority, whether observed before or after Substantial Completion and whether or not fabricated, installed or completed.

B. The quality of materials and workmanship used in restoring this work shall be in full compliance with the requirements of the Contract Documents.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

SECTION 01-4529
TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Laboratory services required to perform the specified testing shall be performed by an independent testing laboratory employed by the Owner.

B. Contractors shall cooperate with the laboratory to facilitate the execution of its required services.

C. Employment of the laboratory shall in no way relieve Contractors of obligations to perform the Work of the Contract.

D. See Section 01-4000 for quality requirements.

1.2 QUALIFICATION OF LABORATORY

A. Laboratory shall meet "Recommended Requirements for Independent Laboratory Qualification", published by American Council of Independent Laboratories.

B. Laboratory shall be authorized to operate in the State in which the Project is located.

1.3 LABORATORY REPORTS

A. After each inspection and test, Laboratory shall promptly submit the laboratory report to the Architect, Construction Manager, Owner, Structural Engineer, and Civil Engineer.

B. Each report shall include:
1. Date issued.
2. Project Title and number.
3. Testing laboratory name, address and telephone number.
4. Name of laboratory inspector and job number.
5. Date and time of sampling or inspection.
6. Record of temperature and weather conditions.
7. Date of test.
8. Identification of specification section.
9. Location of sample or test in the Project.
10. Type of inspection or test and Identification of Testing Standard Specified and Used
11. Results of tests and compliance with Contract Documents.
12. Interpretation of test results.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 LABORATORY RESPONSIBILITIES

A. Laboratory shall provide qualified personnel at site after due notice and cooperate with Architect and Contractor in performance of services.

B. Laboratory shall perform specified inspection, sampling, and testing of products in accordance with specified standards.

C. Laboratory shall ascertain compliance of materials and mixes with requirements of Contract Documents.

D. Laboratory shall promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products.

E. Laboratory shall perform additional inspections and tests required by Architect.

F. Laboratory shall attend preconstruction conferences.

3.2 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 Work.

3.3 CONTRACTOR RESPONSIBILITIES

A. Cooperate with laboratory personnel, and provide access to 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, and for storage and curing of test samples.

C. Notify Architect and laboratory 24 hours prior to expected time for operations requiring inspection and testing services.
   1. When tests or inspections cannot be performed after such notice, Contractor shall notify the laboratory.
   2. If Contractor does not notify laboratory before laboratory personnel are scheduled for this work, Contractor shall reimburse the Owner for laboratory personnel and travel expenses.

3.4 CODE COMPLIANCE TESTING ***** SECTION TO BE EDITED*****

A. The following construction components are to be tested or otherwise approved per 2006 International Building Code, Chapter 17

1. Structural Components: See Structural Drawings for details on the testing of the following components.
   a. Structural Load-bearing Member Fabrication
   b. Steel Construction
   c. Concrete Construction
   d. Soils
   e. Special Foundations
2. Architectural Components: See Specification Sections and Architectural Drawings for additional details on the testing of the following components.
   a. Sprayed Fire-resistant Materials
      1) Prepared surface complies with manufacturer's instructions.
      2) Thickness, density and bond strength of material.
      3) Verification of application per manufacturer's instructions.
3. Mechanical Components: See Mechanical Drawings for details on the testing of the following components.
   a. Smoke Control Systems
4. Seismic Resistance: See Structural Drawings for details on the testing of the following components.
   a. Structural Steel
   b. Cold-formed Steel Framing
   c. Pier Foundations
   d. Architectural Components: Bearing and Non-bearing walls and veneers may need to be tested if in Category D,E or F, over 30' tall, veneer over 5psf, non-bearing walls over 15 psf
   e. Mechanical Components

3.5 ADDITIONAL CODE COMPLIANCE TESTING

A. Additional inspections and tests required by local codes or ordinances, or by a plan approval authority having jurisdiction over the project site, and which are made by a legally constituted authority, shall be the responsibility of and shall be paid for by the Contractor, unless noted above or otherwise provided in the Contract Documents.

3.6 PAYMENT FOR TESTING

A. Initial Services:
   1. When initial tests indicate non-compliance with the Contract Documents, the costs of initial tests associated with that non-compliance will be deducted by the Owner from the Contract Sum.

B. Retesting:
   1. When initial tests indicate non-compliance with the Contract Documents, all subsequent retesting occasioned by the non-compliance shall be performed by the same testing agency and the costs thereof will be deducted by the Owner from the Contract Sum.

C. Contractor's Convenience Testing:
   1. Inspecting and testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

END OF SECTION

SECTION 01-5000
TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Temporary facilities and controls including:
1. Temporary utilities
2. Construction aids
3. Security and protection facilities.
4. Access roads and parking
5. Project identification and signs
6. Field office and storage trailers

1.2 SUBMITTALS

A. Follow Section 01-3323 for making construction submittals.
1. Affidavit: Contractor shall submit affidavit verifying that polyethylene and similar covering materials comply with requirements.

1.3 QUALITY ASSURANCE

A. Regulations: Comply with Federal, state and local codes/regulations.

B. Standards: Comply with applicable NFPA, ANSI, and NECA requirements.

1.4 USE CHARGES

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

PART 2 - PRODUCTS

2.1 MATERIALS

A. Site Enclosure Fence: Provide commercial grade minimum 2", 0.148" thick, galvanized steel chain link fabric fencing equipped with vehicular (and pedestrian) gates and locks.

B. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10 mils minimum thickness, with flame-spread rating of 15 or less per ASTM E84.

C. Materials for temporary facilities and utilities may be new or used, but must be adequate in capacity for the required use. Materials used must not create unsafe conditions, and must not violate the requirements of applicable codes and standards.

2.2 FIELD OFFICE AND STORAGE TRAILERS

A. Provide a prefabricated, mobile unit or job built constructed weathertight field office with:
   1. Lighting, electrical outlets, heating, cooling and ventilating equipment, and equipped with furniture.
   2. Job telephone and fax machine.
   3. Computer, Internet service and email capability.
   4. Space for Project meetings, with table and chairs to accommodate a minimum of 12 persons.
   5. Work table large enough to accommodate working drawings.
   6. Hand carried, portable, UL rated fire extinguishers. Comply with NFFA 10 and NFFA 241 for classification, extinguishing agent and size required by location and class of fire exposure.
   7. Files, drawings, racks, and shelves to maintain order and neatness.

B. Provide janitor service for the office.

C. Provide lighted, weathertight storage trailer, for tools, materials and equipment with adequate space for organized storage and access. Provide heat and ventilation for products requiring controlled conditions.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alterations and Demolition Operations".

B. Heating Units: Provide as required by CFR 29, 1926 OSHA Construction Industry Regulations, Section 1926.154, Temporary Heating Devices.

PART 3 - EXECUTION

3.1 GENERAL

A. Location: Locate temporary facilities to preclude interference with work and as directed.

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

C. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage caused by freezing temperatures and similar elements.
   1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
   2. Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or not later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary

facility. Repair damaged work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are the property of Contractor. Owner reserves right to take possession of Project identification signs.
2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
3. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements in 01-7400.

3.2 TEMPORARY ELECTRICITY AND LIGHTING

A. Temporary Electric Service: Arrange with utility company, provide service required for power and lighting, and pay all costs for service and for power used.

B. Provide adequate artificial lighting for all areas of work when natural light is not adequate for work, and for areas accessible to the public.

C. Lamps and Light Fixtures: Provide general service type incandescent lamps of wattage required for adequate illumination. Where exposed to breakage by construction operations, protect lamps with guard cages or tempered glass enclosures. Provide exterior type fixtures where exposed to weather or moisture.

D. Electrical Power Cords: Use only grounded extension cords: "hard-service" type where exposed to abrasion and traffic. Use single lengths or tape intermediate connections with waterproof electrical tape, or use waterproof connectors.

3.3 TEMPORARY HEAT AND VENTILATION

A. Provide temporary heat and ventilation as required to maintain adequate environmental conditions to facilitate process of the work, to meet specified minimum conditions for the installation of materials, and to protect materials and finishes from damage due to temperature or humidity.

B. Provide adequate forced ventilation of enclosed areas for curing of installed materials, to disperse humidity, and to prevent hazardous accumulations of dust, fumes, vapors or gasses.

C. Pay all costs of installation, maintenance, operation and removal, and for fuel consumed.

3.4 TEMPORARY TELEPHONE/ INTERNET SERVICE/ DIGITAL CAMERA

A. Arrange with local telephone service company, provide direct line telephone service at the construction site for the use of personnel and employees. Service required:

1. One direct line instrument in Field Office.
    a. At each telephone post and answering machine list of important telephone numbers

1) Police and fire departments
2) Ambulance service
3) Contractor's home office
4) Architect's office
5) Engineer's office
6) Owner's office
7) Principal subcontractors' field and home offices

2. Other instruments at the option of the Contractor, or as required by regulations.
3. Computer, internet service, email capability and digital camera.

B. Pay all costs for installation, maintenance and removal, and service charges for local calls. Toll charges shall be paid by the party who places the call.

3.5 TEMPORARY WATER

A. Arrange with utility service company, provide water for construction purposes; pay all costs for installation, maintenance and removal, and service charges for water used.

B. Install branch piping with taps located so that water is available throughout the construction by the use of hoses. Protect piping and fittings against freezing.

3.6 TEMPORARY SANITARY FACILITIES

A. Provide sanitary facilities in compliance with laws and regulations.

B. Service, clean and maintain facilities and enclosures.

3.7 DRINKING WATER FACILITIES

A. Provide containerized tap-dispenser bottled-water type drinking water units, including an adequate supply of paper cups. Use of Owner's drinking fountains is prohibited.

3.8 CONSTRUCTION AIDS

A. Furnish, install and maintain required construction aids, remove on completion of Work.

B. Comply with Federal, State and local codes and regulations.

C. Materials may be new or used, suitable for the intended purpose, but must not violate requirements of applicable codes and standards.

D. Provide construction aids and equipment required by personnel and to facilitate the execution of the Work; scaffolds, staging, ladders, stairs, ramps, runways, platforms, railings, hoists, cranes, chutes and other such facilities and equipment.

E. Provide and operate drainage and pumping equipment. Maintain excavations and site free of standing water.

F. Maintain all facilities and equipment in a first class condition.

3.9 TEMPORARY ROADS AND PAVED AREAS

A. Contractor shall construct temporary roads and paved areas adequate to support loads and to withstand exposure to traffic during construction period. If practical, locate temporary roads and paved areas in same location as permanent roads and paved areas.

B. Access to site for delivery of construction materials and equipment shall be made only from locations as established by the Owner, Architect and Contractor at the pre-construction conference.

3.10 PROJECT IDENTIFICATION AND SIGNS

A. General: Refer to the page following this section for requirements in regards to a Construction Sign. Specifics on wording shall be established prior to construction.

3.11 TEMPORARY CONSTRUCTION

A. Provide temporary weather-tight enclosure of exterior walls for successive areas of the building as work progresses, as necessary to provide acceptable working conditions, provide weather protection for interior materials, allow for effective temporary heating, and to prevent entry of unauthorized persons.
   1. Provide temporary exterior doors with self-closing hardware and padlocks.
   2. Other enclosures shall be removable as necessary for work and for handling of materials.

B. Temporary roof, partition and ceiling enclosure framing and sheet materials shall comply with structural and fire rating requirements of applicable codes and standards.
   1. Polyethylene type coverings to be used for interior and exterior protection of stored materials or products, temporary dust walls, or as weather protection at openings in exterior walls or ceilings to meet requirements in this section.
   2. Close joints between sheet materials, and seal edges and intersections with existing surfaces with fire retardant tape to prevent penetration of dust or moisture.
   3. Construct gypsum board enclosures in occupied areas, if required, to provide STC rating of 50, determined in accordance with ASTM E-90.
   4. Paint surfaces of gypsum board enclosures exposed to public view and in Owner occupied areas.
   5. See section 01-3533 for additional requirements

3.12 SECURITY AND PROTECTION FACILITIES

A. General: Provide as required to prevent public entry to construction areas and adjacent properties from damage from construction operations.

B. Site Enclosure Fence: Before construction begins, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering the site except by entrance gates.

C. Barricades, Warning Signs and Lights: Comply with standard and code requirements and authorities having jurisdiction. Provide barricades and temporary lighting at streets and open ditches where construction work may present hazards to vehicles and personnel. Where appropriate provide flashing red or amber lights.

D. Tree and Plant Protection: Provide barriers around trees and plants designated to remain and those adjacent to the site. Protect against vehicular traffic, stored materials, dumping, chemically injurious materials, and puddling or continuous running water.
   1. Replace, or suitably repair, trees and plants designated to remain which are damaged or destroyed due to construction operations.

3.13 TEMPORARY FIRE PROTECTION

A. Until fire protection needs are supplied by permanent facilities, install and maintain temporary fire protection facilities of the types needed to protect against reasonably predictable and controllable fire losses.

B. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one (1) extinguisher on each floor at or near each exit.

C. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, exits and other access routes for fighting fires. Prohibit smoking in hazardous fire exposure areas.

D. Provide supervision of welding operations, combustion type temporary heating units, and similar sources of fire ignition.

E. 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.

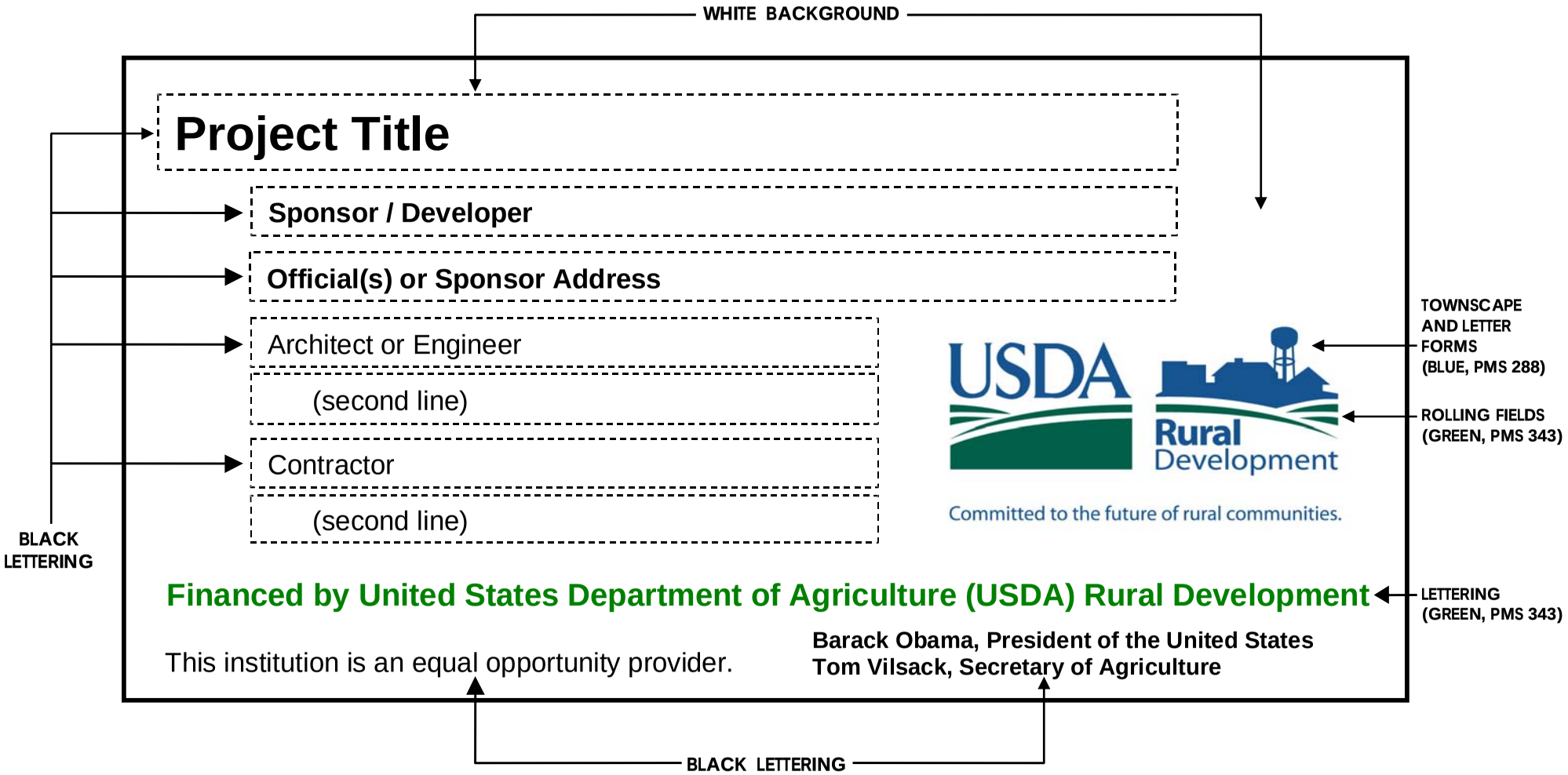
3.14 REMOVAL

A. Remove temporary materials, equipment, services and construction prior to Substantial Completion.

B. Clean and repair damage caused by installation or use of temporary facilities. Remove underground installations to a depth of two feet and grade as indicated or directed by the Architect.

END OF SECTION

TEMPORARY CONSTRUCTION SIGN FOR RURAL DEVELOPMENT PROJECTS



SIGN DIMENSIONS: **1200 mm x 2400 mm x 19 mm (approx. 4' x 8' x ¾")**
PLYWOOD PANEL (APA RATED A-B GRADE–EXTERIOR)

SECTION 01-6500
PRODUCT DELIVERY REQUIREMENTS

PART 1 - GENERAL

1.1 PACKAGING AND TRANSPORTATION

A. Require supplier to package products in boxes or crates for protection during shipment. Protect sensitive products against exposure to elements and moisture.

B. Protect sensitive equipment and finishes against impact, abrasion and other damage.

1.2 DELIVERY

A. Arrange deliveries of products, including products furnished by the Owner, in accordance with construction schedules and in ample time to facilitate inspection prior to installation.

B. Coordinate to avoid conflict with work and conditions at the site. Specifically coordinate to determine:
1. Work of the Owner.
2. Products furnished by the Owner.
3. Work of other contractors.
4. Availability of equipment and personnel for handling products.
5. Owner's use of premises.

C. Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.

D. Clearly mark partial deliveries of component parts of equipment to permit easy accumulation of parts and to facilitate assembly.

E. Immediately on delivery, inspect shipments to assure:
1. Compliance with requirements of Contract Documents and approved submittals.
2. Quantities are correct.
3. Containers and packages are intact and that labels are legible.
4. Products are properly protected and undamaged.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

SECTION 01-6600
PRODUCT STORAGE AND HANDLING REQUIREMENTS

PART 1 - GENERAL

1.1 GENERAL STORAGE

A. Store and handle products immediately on delivery in accordance with the manufacturer's printed instructions, with seals and labels intact and legible, and protect until installed in the work.

B. Arrange storage in a manner to provide easy access for inspection.

1.2 ENCLOSED STORAGE

A. Store products subject to damage by the elements in substantial weathertight enclosures.

B. Maintain temperature and humidity within the ranges required by manufacturer's instructions.

C. Store unpacked products on shelves, in bins or in neat piles, accessible for inspection.

1.3 EXTERIOR STORAGE

A. Provide substantial platforms, blocking or skids to support fabricated products above the ground to prevent soiling or staining.

B. Cover products which are subject to discoloration or deterioration from exposure to the elements with impervious sheet coverings. Provide adequate ventilation to avoid condensation.

C. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.

D. Provide surface drainage to prevent flow or ponding of rainwater.

E. Prevent mixing of refuse or chemically injurious materials or liquids.

1.4 MAINTENANCE OF STORAGE

A. Maintain a periodic system of inspections of stored products on a scheduled basis to assure that:
   1. Condition of storage facilities is adequate to provide required conditions.
   2. Required environmental conditions are maintained on a continuing basis.
   3. Surfaces of products exposed to elements are not adversely affected.
   4. Note: Any weathering of products, coatings and finishes is NOT acceptable under requirements of the Contract Documents.

B. Have complete manufacturer's instructions for servicing accompanying each item, with notice of enclosed instructions shown on the exterior of the package, for mechanical and electrical equipment which requires servicing during long term storage.

1. Comply with the manufacturer's instructions on a scheduled basis.
2. Connect space heaters which are part of the electrical equipment and operate continuously until equipment is placed in service.

1.5 PROTECTION AFTER INSTALLATION

A. Provide substantial coverings to protect installed products from damage from subsequent operations. Remove when no longer needed, prior to completion of work.

B. Control traffic to prevent damage to equipment and surfaces.

C. Provide coverings to protect finished surfaces from damage.

D. Cover projections, wall corners, jambs, sills and soffits of openings, in areas used for traffic and passage of products in subsequent work.

E. Protect finished floors and stairs from dirt and damage.

F. In other areas subject to foot traffic, secure heavy paper, sheet goods on the materials in place.

G. For movement of heavy products, lay planking or similar materials in place

H. Waterproofed and roofing surfaces:
   1. Prohibit use of surfaces for traffic of any kind, and for storage of any products.
   2. When some activity must take place in order to carry out the Contract, obtain recommendations of the installer for protection of surface.
   3. Install recommended protection and remove on completion of that activity.
   4. Restrict the use of adjacent unprotected areas.

I. Prohibit traffic of any kind across planted lawn and landscaped areas.

1.6 PRODUCT HANDLING

A. Provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.

B. Provide additional protection during handling as necessary to prevent scraping, marring, or otherwise damaging products or surrounding spaces.

C. Handle products by using methods that will prevent bending or over stressing.

D. Lift heavy components only at designated lifting points.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

SECTION 01-7329
CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. This section modifies the General Conditions to include incidental requirements and limitations for cutting, fitting and patching that may be required within the new construction to complete the Work, or make its several parts fit together. Incidental cutting and patching is performed for coordination of the Work, to uncover for access or inspection, to obtain samples for testing, and to permit alterations to be performed or for similar purposes.

1.2 ADVANCED WRITTEN REQUESTS

A. Submit written request in advance of cutting or alteration work which affects the following:
   1. Structural integrity of any element of the Project.
   2. Integrity of weather-exposed or moisture-resistant element.
   3. Efficiency, maintenance or safety of any operational element.
   4. Visual qualities of sight-exposed elements.
   5. Work of Owner or separate contractor.

B. Include the following in each written request:
   1. Identification of Project.
   2. Location and description of affected work.
   3. Necessity for cutting or alterations.
   4. Description of proposed work, and materials and products to be used.
   5. Alternative to cutting and patching.
   6. Effect on work of Owner or separate contractor.
   7. Written permission of the affected separate contractor.
   8. Date and time the work will be executed.

1.3 QUALITY ASSURANCE

A. General: Employ skilled workmen or firms qualified to perform cutting and patching specified in this section. Proceed with cutting and patching at the earliest feasible time and complete without delay.

B. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would change their load-carrying capacity or load-deflection ratio.

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

D. Visual Requirements: Do not cut and patch construction exposed on exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic or visual qualities. Do not cut and patch construction in a manner that would

result in visual evidence of cutting and patching. Remove and replace construction which was cut and patched in a visually unsatisfactory manner.

E. Warranty: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void required warranties.

1.4 DESCRIPTION

A. Install Work in such a manner and sequence as to preclude or minimize cutting and patching of new Work.

B. Execute cutting, fitting or patching of Work, required to:
1. Make several parts fit properly.
2. Uncover Work to provide for installation of ill timed Work.
3. Remove and replace defective Work.
4. Remove and replace non-conforming Work.
5. Remove samples of installed Work for testing.
6. Install specified Work in existing construction.
7. Provide rerouting penetrations of non-structural surfaces for installation of piping and electrical conduit.
8. Patch and repair fireproofing damaged after installation of other Work or demolition activities.
9. Remove and finish construction at connections to other structures.

C. Do not cut building framing members or modify the foundation without written approval or consent of Architect.

D. Be responsible for damage resulting from violation of these provisions.

E. Use only firms or individual trades qualified to perform Work required under this Section.

1.5 JOB CONDITIONS

A. Before start of Work, obtain and pay for all permits required by all authorities having jurisdiction and notify all interested utilities companies.

B. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

C. Items to be salvaged and delivered to Owner shall be carefully removed and properly stored in an area easily accessible for removal by Owner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Types: New materials and products of types and quality identical to existing materials.

B. For exposed surfaces, use materials that visually match existing adjacent surfaces.

C. Use materials whose installed performance will equal or surpass that of existing materials.

D. Comply with specifications for type of Work to be performed.

PART 3 - EXECUTION

3.1 INSPECTION

A. Perform preliminary investigations as required to ascertain extent of Work.
   1. Conditions which would be apparent by such investigation will not be allowed as cause for claims for extra costs.

B. If unsafe or unsatisfactory conditions are encountered, take corrective action before proceeding.

C. Before proceeding, meet at Project Site with parties involved in cutting and patching, including mechanical and electrical trades.
   1. Review areas of potential interference and conflict.
   2. Coordinate procedures and resolve potential conflicts before proceeding.

3.2 PREPARATION

A. Provide adequate shoring, bracing and support as required to maintain structural integrity of Project.

B. Provide protection from elements for other portions of Project which may be affected.

C. Erect and maintain dustproof partitions as required to prevent spreading of dust, fumes and smoke to other parts of the building.

3.3 CUTTING AND REMOVAL - GENERAL

A. Execute fitting and adjustment to provide finished installation to comply with specified tolerances and finishes.

B. Execute cutting by methods which will prevent damage to existing or other Work and will provide proper surfaces to receive installation of new Work.

C. Neatly cut and remove materials, and prepare all openings to receive new Work.

D. Concrete or masonry shall be removed in small sections.

E. Provide shoring, bracing, and other supports to prevent movement, settlement, or collapse of remaining or adjacent wall areas, structure, or facilities.

F. Arrange shoring, bracing, and supports to prevent overloading of structure.

G. Take all precautions necessary to prevent damage to existing remaining work or to adjacent facilities.

H. Use methods which will prevent interference with use of remaining and adjacent facilities by Owner.

I. Provide for cutting, fitting, repairing, patching and finishing of Work disturbed by installation of new Work.

3.4 MATCHING AND PATCHING

A. At penetrations of fire-rated walls, ceilings, or floor construction, completely seal voids with fire-rated material, full thickness of the construction element.

B. Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

C. Use methods and materials similar in appearance, and equal in quality to areas or surfaces being repaired.

D. Restore Work which has been cut or removed; install new products to provide completed Work in accord with requirements of Contract Documents.

E. Patch Work must in every way possible match adjacent surfaces.

F. Re-finish entire surfaces as necessary to provide an even finish to match adjacent finishes.
   1. Continuous surfaces; to nearest intersections.
   2. Assembly - entire refinishing.

END OF SECTION

SECTION 01-7400
CLEANING AND WASTE MANAGEMENT

PART 1 - GENERAL

1.1 SITE MAINTENANCE

A. Maintain premises and public properties free from accumulations of waste, debris, and rubbish caused by operations.

B. Keep streets clean from mud, dirt, debris, and other materials removed from the job site.

C. At completion of work, remove waste materials, rubbish, tools, equipment, machinery, and surplus materials. Clean all sight-exposed surfaces.

D. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
   1. Do not burn or bury rubbish and waste materials on project site.
   2. Do not dispose of volatile waste such as mineral spirits, oil, and paint thinner in storm drains or sanitary sewers.

E. Hazard Control:
   1. Store volatile wastes in covered metal containers, and remove from premises daily.
   2. Prevent accumulation of waste which might cause hazardous conditions.
   3. Provide adequate ventilation during use of volatile and noxious substances.

1.2 PROGRESS CLEANING

A. Keep building, grounds, and public properties free from accumulations of waste materials and rubbish.

B. Wet down dry materials and rubbish to prevent dust.

C. During progress of Work, clean site and public properties and dispose of waste materials, debris and rubbish.

D. Provide on-site containers for collection of waste materials, debris, and rubbish.

E. Vacuum interior building areas, where work is performed prior to painting and other finish work.

F. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, new painted surfaces.

1.3 FINAL CLEANING

A. Employ experienced workmen or professional cleaners for final cleaning.

B. In addition to removal of debris and cleaning specified in other sections, clean interior and exterior exposed-to-view surfaces.

C. Remove temporary protection and labels not required to remain.

D. Clean finishes free of dust, stains, films and other foreign substances.

E. Clean transparent and glossy materials to a polished condition; remove foreign substances. Polish reflective surfaces to a clear shine.

F. Vacuum clean carpeted and similar soft surfaces.

G. Clean resilient and floor finishes as specified.

H. Clean surfaces of equipment; remove excess lubrication.

I. Clean plumbing fixtures to a sanitary condition.

J. Clean permanent filters of ventilating equipment and replace disposable filters when units have been operated during construction; in addition, clean ducts, blowers, and coils when units have been operated without filters during construction.

K. Clean light fixtures and lamps.

L. Remove debris, rubbish, dirt, etc. from open concealed spaces, chases and above ceilings.

M. Repair, patch, and touch-up marred surfaces to specified finish and to match adjacent surfaces.

N. Remove waste, foreign matter, and debris from roofs and drainage systems.

O. Remove waste, debris, and surplus materials from site. Clean grounds; remove stains, spills, and foreign substances from paved areas and sweep clean. Rake clean other exterior surfaces.

P. Maintain cleaning until Final Completion.

Q. Prior to Final Completion, or Owner occupancy, Contractor shall conduct an inspection of sight exposed interior and exterior surfaces, and all work areas, to verify that the entire work is clean.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Use only cleaning materials recommended by manufacturer of surface to be cleaned.

B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 - EXECUTION – NOT USED

END OF SECTION

SECTION 01-7700
CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUBSTANTIAL COMPLETION

A. When Work is considered to be substantially complete, submit the following to Architect:
   1. Written notice that the Work, or designated portion, is substantially complete.
   2. List of items to be completed or corrected (contractor's punch list).

B. Within a reasonable time, Architect will inspect to determine status of completion, and compile a punch list of items to be completed and corrected. If Architect determines that Work is not substantially complete, he will immediately notify Contractor in writing. Architect will generally point out his reasons, but he will not be obligated to give an exhaustive list of discrepancies.

C. Contractor's Duties: Remedy deficiencies and send Architect another written Notice of Substantial Completion.

D. Architect's Actions:
   1. Reinspect the Work.
   2. When Architect considers Work substantially complete, he will issue the Certificate of Substantial Completion.

1.2 AGENCY INSPECTIONS

A. When Work is considered to be substantially complete, the Contractor shall schedule inspections by all applicable authorities having jurisdiction. The Contractor shall notify the Owner and Architect of the anticipated date of these inspections, and further advise of any action needed by Owner and Architect to facilitate these inspections.

B. An inspection by the state and local authorities having jurisdiction will be required following Substantial Completion and prior to Owner Occupancy. The Contractor shall notify the Architect approximately 30 days prior to the desired State Health Department inspection date so that the Architect may schedule this inspection. The Contractor shall have the documentation complete and in good order to review during the inspection, including, but not limited to:
   1. Certificate of Compliance or Occupancy issued by the local building official.
   2. Certification of Compliance issued by the state fire marshal.
   3. Medical Gas Certification.
   4. Sprinkler Certification.
   5. Fire Alarm Installation Certification. (Applicable State form, completed by Fire Alarm Installer.)
   6. Documentation of flame spread ratings of vinyl wall coverings.
   7. Elevator Certification.
   8. Mechanical, Electrical Systems Certification.
   9. Nurse Call/Code Blue Certification.
   10. Final Test & Balance Report.
   11. Emergency Generator Start-up Sheets & most recent Test Run.
   12. Certification that hot water temperatures are properly adjusted.

13. Certification that kitchen equipment is installed and fully operational.

1.3 OWNER OCCUPANCY

A. Owner's Action: Occupy the Project, or designated portion of the Project, in accordance with provisions of the Certificate of Substantial Completion.

B. Contractor's Duties:
   1. Obtain Certificate of Occupancy if required by local building codes authority.
   2. Obtain consent of insurance company or companies to keep insurance in force during partial occupancy by Owner.
   3. Make corrections listed on punch list attached to Certificate of Substantial Completion.
   4. Perform final clean-up.

1.4 FINAL COMPLETION

A. When Work is considered to be complete, Contractor shall submit certification indicating the following:
   1. Contract Documents have been reviewed and Work has been inspected for compliance with those Documents.
   2. Work has been completed in accordance with Contract Documents.
   3. All punch list items have been corrected.
   4. Equipment and systems have been tested in presence of Owner's Representative and are operational.
   5. Work is complete and ready for final inspection.

B. Architect's Actions During Final Inspection:
   1. Inspect to verify the status of completion with reasonable promptness.
   2. If he considers Work incomplete or defective, he will promptly notify Contractor in writing, listing deficiencies.

C. Contractor's Duties: Take immediate action to correct deficiencies, and send certification to Architect that Work is complete.

D. When Architect determines that Work is acceptable, he will request Contractor to make closeout submittals.

1.5 REINSPECTION FEES

A. Should status of completion of work require reinspection by Architect due to failure of work to comply with Contractor's claims on initial inspection, Owner will deduct the amount of Architect compensation for reinspection services from final payment to Contractor.

1.6 CONTRACTOR'S CLOSEOUT SUBMITTALS REQUIRED

A. Documents required by State Licensure inspectors and other authorities having jurisdiction.

B. Certification that new work in building is asbestos free as required in Section 01-1100.

C. Project Record Documents: Comply with Section 01-7839.

D. Operation and Maintenance Data: Comply with Section 01-7823.

E. Product Warranties and Bonds: Comply with Section 01-7833.

F. Keys and Keying Schedule: Comply with Section 08-7100.

G. Evidence of Payment and Release of Liens: Comply with requirements and Conditions of the Contract.

H. Consent of Surety to Final Payment.

I. Certificates of Insurance for Products and Completed Operations: Comply with Supplementary Conditions.

J. Test Results: Complete, dated test results of various systems signed by person authorized to sign for a qualified testing agency which conducted tests.

K. Provide products, spare parts and maintenance materials in quantities specified in each section, in addition to that used for construction of the work.
   1. Coordinate with Owner; deliver to Project Site and obtain receipt to include with final payment.

1.7 STATEMENT OF ADJUSTMENT OF ACCOUNTS

A. Submit a final statement to Architect indicating all adjustments to the Contract Sum. Include the following:
   1. Original Contract Sum.
   2. Previous change orders.
   3. Changes under allowances.
   4. Changes under unit prices.
   5. Deductions for uncorrected work.
   6. Penalties and bonuses.
   7. Deductions for liquidated damages.
   8. Deductions for reinspection fees.
   9. Other adjustments to Contract Sum.
   10. Total Contract Sum, as adjusted.
   11. Previous payments.
   12. Sum remaining due.

B. If required, a final Change Order will be prepared reflecting approved adjustments to Contract Sum which were not previously made on Change Orders.

1.8 FINAL APPLICATION FOR PAYMENT

A. Submit final Application for Payment in accordance with procedures and requirements of the Conditions of the Contract.

1.9 FINAL PAYMENT

A. Owner will make final payment.

B. If the final payment is materially delayed through no fault of the Contractor, the Owner may issue a semi-final payment.

1.10 POST-CONSTRUCTION INSPECTION

A. Prior to expiration of one year from the Date of Substantial Completion, the Architect will make a visual inspection of the Project to determine whether correction of Work is required, in accordance with the Conditions of the Contract.

B. The Architect will promptly notify the Contractors, in writing, of any observed deficiencies. Contractors shall then correct deficiencies promptly.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

SECTION 01-7823
OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Compile product data and related information appropriate for Owner's maintenance and operation of products furnished under the Contract.

B. Prepare operating and maintenance data as specified in this Section and as referenced in other pertinent sections of Specifications.

C. Instruct Owner's personnel in the maintenance of products and in the operation of equipment and systems.

1.2 QUALITY ASSURANCE

A. Have data prepared by personnel:
1. Trained and experienced in maintenance and operation of the described products.
2. Completely familiar with requirements of this Section.
3. Skilled as a technical writer to the extent required to communicate essential data.
4. Skilled as a draftsman competent to prepare required drawings.

1.3 SUBMITTALS

A. Submit a copy of preliminary draft of proposed format and outline of contents of the operating and maintenance instructions manuals prior to Substantial Completion.

B. Submit one copy of completed manuals in final form prior to final inspection or acceptance.

C. Submit two (2) copies of approved manuals in final form after final inspection or acceptance.

PART 2 - PRODUCTS

2.1 OPERATING AND MAINTENANCE INSTRUCTION MANUALS

A. Prepare a neatly typewritten table of contents for each volume, arranged in a systematic order, to include:
1. Contractor, name of responsible principal, address, and telephone number.
2. A list of each product required to be included, indexed to the content of the volume.
3. List, with each product, the name, address, and telephone number of:
   a. Subcontractor or installer.
   b. Maintenance contractor, as appropriate.
   c. Identify the area of responsibility of each.
   d. Local source of supply for parts and replacement.
4. Identify each product by product name and other identifying symbols as set forth in Contract Documents.

B. Product Data:

1. Include only those sheets which are pertinent to the specific product.
2. Annotate each sheet to:
   a. Clearly identify the specific product or part installed.
   b. Clearly identify the data applicable to the installation.
   c. Delete references to inapplicable information.

C. Drawings:
1. Supplement product data with drawings as necessary to clearly illustrate:
   a. Relations of component parts of equipment and systems.
   b. Control and flow diagrams.
2. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.
3. Do not use Project Record Documents as maintenance drawings.

D. Written text, as required to supplement product data for the particular installation:
1. Organize in a consistent format under separate headings for different procedures.
2. Provide a logical sequence of instructions for each procedure.

E. Provide information sheet for Owner's personnel noting:
1. Proper procedures in the event of failure.
2. Instances which might affect the validity of warranties or bonds.

2.2 MATERIAL INFORMATION

A. Content for architectural products:
1. Manufacturer's data, giving full information on products.
2. Information required for reordering specially manufactured products.
3. Instructions for care and maintenance.
4. Manufacturer's recommendation for types of cleaning agents and methods.
5. Cautions against cleaning agents and methods which are detrimental to the product.
6. Recommended schedule for cleaning and maintenance.

B. Content for moisture protection and weather exposed products:
1. Manufacturer's data, giving full information on products.
2. Applicable standards.
3. Chemical composition.
4. Details of installation.

C. Instructions for inspection, maintenance and repair.

D. Additional requirements for maintenance data: The respective section of Specifications.

E. Provide complete information for products of sections of the Project Manual.

2.3 EQUIPMENT AND SYSTEMS INFORMATION

A. Content for each unit of equipment and system, as appropriate:
1. Description of unit and component parts.
2. Function, normal operating characteristics, and limiting conditions.
3. Performance curves, engineering data, and tests.
4. Complete nomenclature and commercial number of all replaceable parts.

B. Operating Procedures:
   1. Start-up, break-in, routine and normal operating instructions.
   2. Regulation, control, stopping, shutdown, and emergency instructions.
   3. Summer and winter operating instructions.
   4. Special operating instructions.

C. Maintenance Procedures:
   1. Routine operations.
   2. Guide to "troubleshooting."
   3. Disassembly, repair, and reassembly.
   4. Alignment, adjusting, and checking.

D. Servicing and lubrication schedule.
   1. List of lubricants required.

E. Manufacturer's printed operating and maintenance instructions.

F. Description of sequence of operation by control manufacturer.

G. Original manufacturer's parts list, illustrations, assembly drawings, and diagrams, required for maintenance.
   1. Predicted life of parts subject to wear.
   2. Items recommended to be stocked as spare parts.

H. As-installed control diagrams by controls manufacturer.

I. Each contractor's coordination drawings.
   1. As-installed color coded piping diagrams.

J. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.

K. Other data as required under pertinent sections of Specifications.

L. Content for each electrical and electronic system, as appropriate:
   1. Description of system and component parts.
   2. Function, normal operating characteristics and limiting conditions.
   3. Performance curves, engineering data, and tests.
   4. Complete nomenclature and commercial number of replaceable parts.
   5. Circuit directories of panelboards.
   6. Electrical service.
   7. Controls.
   8. Communications.
   9. As-installed color-coded wiring diagrams.
   10. Operating schedules:
      a. Routine and normal operating instructions.
      b. Sequences required.
      c. Special operating instructions.
   11. Maintenance procedures:
      a. Routine operations.
      b. Guide to "troubleshooting."
      c. Disassembly, repair, and reassembly.
      d. Adjustment and checking.

12. Manufacturer's printed operating and maintenance instructions.
13. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
14. Other data as required under pertinent section of Specifications.

M. Prepare and include additional data when the need for such data becomes apparent during the instruction of Owner's personnel.

N. Additional requirements for operating and maintenance data: The respective sections of Specifications.

O. Provide complete information for products of sections of the Project Manual.

2.4 INSTRUCTION OF OWNER'S PERSONNEL

A. Prior to final inspection or acceptance, fully instruct Owner's designated operating and maintenance personnel in the operation, adjustment and maintenance of all products, equipment, and systems.

B. Record all instructions and provide on DVD with manuals.

C. For each item, record the following information:
1. Time and date of instruction.
2. Name(s) of personnel providing instruction.
3. Name(s) of personnel receiving instruction.
4. Items covered during instructions.

D. Use operating and maintenance manual to constitute the basis of instruction.
1. Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Prepare data in the form of an instructional manual for use by Owner's personnel. Organize information by sections of the Project Manual.

B. Format:
1. Paper: 8-1/2" x 11", white.
2. Text: Manufacturer's printed data, or neatly typewritten.

C. Drawings:
1. Provide reinforced punched binder tab; bind in with text.
2. Fold larger drawings to the size of the text pages.

D. Product Literature:
1. Provide fly-leaf for each separate product, or each piece of operating equipment.
2. Provide typed description of product, and major component parts of equipment.
3. Provide indexed tabs.

E. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS", etc.

F. List:
   1. Title of Project.
   2. Identity of separate structure as applicable.
   3. Identity of general subject matter covered in manual.

G. Binders:
   1. Commercial quality three-ring binders with durable and cleanable plastic covers.
   2. When multiple binders are used, correlate the data into related consistent groupings.

END OF SECTION

SECTION 01-7833
PRODUCT WARRANTIES AND BONDS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Provide warranties and bonds required for specific products in individual Specifications Sections. See Section 01-1100.

1.2 SUBMITTALS

A. Submit a copy of preliminary draft of proposed format and outline of contents of the warranties and bonds manuals prior to Substantial Completion.

B. Submit one copy of completed manuals in final form prior to final inspection or acceptance.

C. Submit two (2) copies of approved manuals in final form after final inspection or acceptance.

D. For items of work when acceptance is delayed beyond date of Substantial Completion, submit documents to Architect after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 - PRODUCTS

2.1 WARRANTIES AND BONDS MANUALS

A. Obtain warranties and bonds, executed in duplicate by responsible subcontractors, suppliers and manufacturers, after completion of the applicable item of work.
   1. Except for items put into use with Owner's permission, leave date of beginning of time of warranty blank until the Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Bind in commercial quality 8-1/2 x 11 three-ring side binders, with plastic covers.

B. Label cover of each binder with typed or printed title, "WARRANTIES AND BONDS," with title of Project; name, address, and telephone number of Contractor; and name of responsible principal.

C. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified and the name of product or work item.

D. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing.
   1. Provide full information, using separate typed sheets as necessary.
   2. List subcontractor, supplier, and manufacturer, with name, address and telephone number of responsible principal.

END OF SECTION

SECTION 01-7839
PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Procedural requirements for maintaining documents and samples at the site as required in the General Conditions.
   1. Coordinate with Divisions 23 and 26 through 28 for Mechanical and Electrical requirements.

B. The General Conditions require the Construction Manager and Component Contractor to maintain a record copy of the following for Architect's review:
   1. Drawings showing architectural and engineering systems and components.
   2. Specifications and Schedule (Project Manual).
   3. Addenda.
   4. Change Orders and other documents which modify original document.
   5. Approved shop drawings, product data and samples.
   6. Records of all changes made during construction.

C. In addition to the above, Contractor shall maintain at the site a record copy of the following:
   1. Field test records.
   2. Manufacturer's certificates.
   3. Fixed equipment manuals.
   4. Inspection certificates.

1.2 SUBMITTALS

A. At Contract Closeout Submit:
   1. Record Documents and samples, including Record Drawings.
   2. Surveyor's certificate for building location, first floor elevation, handicap ramps, to Architect.

B. Submit Record Documents and Surveyor’s Certificate under cover of a transmittal letter containing:
   1. Date.
   2. Project title and number.
   3. Contractor's and subcontractor's names and addresses.
   4. Title and number of each Record Document.
   5. Certification that each document submitted is complete and accurate.
   6. Signature of Contractor or his authorized representative.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Drawings which are required for Owner's records, shall be recorded by the both the Construction Manager and Component Contractor.

B. Construction Manager and Component Contractor shall transfer all changes recorded on construction drawings on the Record Drawings.
   1. All information shall be recorded neatly and legible.
   2. Use separate colors for recording information about each major system.
   3. Establish a code to denote the color for each trade and indicate by a schedule placed on the front sheet of the Record Drawings.

C. Construction Manager shall include with Record Document Submittal a certificate and drawing, from a surveyor licensed in the state in which the project is located, verification of the building location and first floor elevation.

D. Construction Manager shall include with Record Document Submittal a certificate and drawing, from a surveyor licensed in the state in which the project is located, verification that handicap ramp slopes are not greater than slopes indicated on project documents, and that the widths and lengths of the ramps indicated are considered minimums per governing codes.

PART 3 - EXECUTION

3.1 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Store Record Documents and samples in a file in the Field Office, apart from the documents used for construction.
   1. Provide files, racks and secure storage for Record Documents and samples.

B. Label and file Record Documents in sequence with section number listings in Table of Contents of this Project Manual.
   1. Label each document "PROJECT RECORD" in the lower right hand corner in neat, large printed letters.

C. Maintain Record Documents in clean, dry, legible condition.
   1. Do not use Record Documents for construction purposes.

D. Keep Record Documents and samples available for inspection by Architect and Engineer.

3.2 RECORDING

A. Record information concurrently with construction progress.
   1. Do not conceal work until required information has been recorded.

B. Contract Drawings and Shop Drawings: Legibly mark each item to record actual construction, including the following:
   1. Depth of footings in relation to finish first floor level.
   2. Measure horizontal and vertical locations of underground utilities, valves, etc. referenced to building exterior lines. Show direction of flow of pipe and depth of piping underground.
   3. Field changes of dimensions and details.
   4. Changes made by Contract Modifications.
   5. Details not on original Contract Drawings.
   6. Fixed equipment.

C. Project Manual: Legibly mark to record actual construction, including the following:
   1. On appropriate pages, record changes made by Addenda, Change Orders and other modifications.
   2. On appropriate pages, enter trade name, manufacturer, catalog number, and name of supplier of each product and item actually installed, if different from that specified.
   3. Other items installed but not originally specified.

END OF SECTION

SECTION 01-7841
SPARE PARTS AND MAINTENANCE MATERIALS

PART 1 - GENERAL

1.1 SPARE PARTS AND TOOLS

A. Package in clearly identified boxes.
   1. Indicate manufacturer's name, part name and stock number.
   2. Indicate piece of equipment part or tool is for.
   3. Indicate name, address and phone number of closest supplier.

1.2 MAINTENANCE MATERIALS

A. Package in clearly identified boxes.
   1. Indicate trade name and stock number.
   2. Indicate which item material is to be used with.
   3. Indicate name, address and phone number of closest supplier.

1.3 EXTRA MATERIALS

A. Package in clearly identified containers, or install where indicated.
   1. Indicate trade name, stock number, size, color, etc.
   2. Indicate where product is to be used.
   3. Indicate name, address and phone number of closest supplier.

B. See individual specification sections for quantity required.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1 DELIVERY

A. Deliver to Owner prior to substantial completion unless Owner requests earlier delivery.

B. Deliver to location directed by Owner.

C. Use transmittal form acceptable to Architect.
   1. Transmittal to indicate Owner's acceptance.

END OF SECTION

SECTION 03 3000
CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mix design, placement procedures, and finishes.

B. Related Sections include the following:

1. Division 2 Section "Cement Concrete Pavement" for concrete pavement and walks.

1.3 DEFINITIONS

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

1.4 SUBMITTALS

A. Product Data: For each type of manufactured material and product indicated.

B. Design Mixes: For each concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

C. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement. Include special reinforcement required for openings through concrete structures.

D. Welding Certificates: Copies of certificates for welding procedures and personnel.

E. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:

F. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:

1. Cementitious materials and aggregates.
2. Form materials and form-release agents.
3. Steel reinforcement and reinforcement accessories.
4. Admixtures.
5. Waterstops.
6. Curing materials.
7. Floor and slab treatments.
8. Bonding agents.
9. Adhesives.
10. Vapor retarders.
11. Epoxy joint filler.
12. Joint-filler strips.
13. Repair materials.

G. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

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

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.

1. Manufacturer must be certified according to the National Ready Mixed Concrete Association's Certification of Ready Mixed Concrete Production Facilities.

C. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1.

D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.

E. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel."

F. ACI Publications: Comply with the following, unless more stringent provisions are indicated:

1. ACI 301, "Specification for Structural Concrete."
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle steel reinforcement to prevent bending and damage.

1. Avoid damaging coatings on steel reinforcement.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1.
2. See architectural drawing for special form finishes.

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

C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

D. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch minimum.

E. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

F. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of the exposed concrete surface.
2. Furnish ties with integral water-barrier plates for concrete required to be water tight.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615, Grade 60 deformed.

B. Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

2.3 REINFORCEMENT ACCESSORIES

A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete, and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected or CRSI Class 2 stainless-steel bar supports.

B. Joint Dowel Bars: Plain-steel bars, ASTM A 615, Grade 60. Cut bars true to length with ends square and free of burrs.

2.4 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I.

B. Normal-Weight Aggregate: ASTM C 33, uniformly graded:

C. Lightweight Aggregate: ASTM C 330.

D. Water: Potable and complying with ASTM C 94.

2.5 ADMIXTURES

A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.

B. Air-Entraining Admixture: ASTM C 260.

C. Water-Reducing Admixture: ASTM C 494, Type A.

D. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.

E. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.

F. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

2.6 WATERSTOPS

A. Flexible PVC Waterstops: CE CRD-C 572, for embedding in concrete to prevent passage of fluids through joints.

1. Profile: As indicated.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. PVC Waterstops:

a. Greenstreak.
b. Meadows: W. R. Meadows, Inc.
c. Murphy: Paul Murphy Plastics Co.
d. Tamms Industries Co.; Div. of LaPorte Construction Chemicals North America, Inc.
e. Vinylex Corporation.
f. Westec Barrier Technologies; Div. of Western Textile Products, Inc.

C. Self-Expanding Strip Waterstops: Manufactured rectangular or trapezoidal strip, sodium bentonite or other hydrophylic material for adhesive bonding to concrete.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

a. Volclay Waterstop-RX; Colloid Environmental Technologies Co.
b. Conseal CS-231; Concrete Sealants Inc.
c. Swellseal Joint; De Neef Construction Chemicals (U.S.) Inc.
d. Hydrotite; Greenstreak.
e. Mirastop; Mirafi Moisture Protection, Div. of Royal Ten Cate (USA), Inc.

2.7 VAPOR BARRIER

A. Vapor Barrier: Minimum 15 mill thick polyolefin geomembrane manufactured from ISO certified virgin resins.

1. Water Vapor Barrier	ASTM D-1745	Meets or exceeds Class B
2. Water Vapor Transmission Rate	ASTM E-96	0.006 gr./ft2/hour or lower
3. Permeance Rating	ASTM E-96	0.01 gr./ft2/hour or lower
4. Puncture Resistance	ASTM E-1745	Minimum 1970 grams
5. Tensile Strength	ASTM E-1745	Minimum 45.0 lbf/in

B. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D 448, Size 10, with 100 percent passing a No. 4 sieve and 10 to 30 percent passing a No. 100 sieve; meeting deleterious substance limits of ASTM C 33 for fine aggregates.

C. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448, Size 57, with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

2.8 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

E. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

F. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

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

1. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound:

    a. Spray-Cure & Seal Plus; ChemMasters.
    b. Lumiseal Plus; L&M Construction Chemicals, Inc.
    c. CS-309/30; W. R. Meadows, Inc.
    d. Cure & Seal 31 percent UV; Symons Corporation.
    e. Masterkure-N-Seal HS; ChemRex/MBT.

2. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound:

    a. Klear-Kote Cure-Sealer-Hardener, 30 percent solids; Burke Group, LLC (The).
    b. Polyseal WB; ChemMasters.
    c. Lumiseal WB Plus; L&M Construction Chemicals, Inc.
    d. Vocomp-30; W. R. Meadows, Inc.
    e. Masterkure-N-Seal W; ChemRex/MBT/.

2.9 RELATED MATERIALS

A. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.

B. Epoxy-Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class and grade to suit requirements:

C. Reglets: Fabricate reglets of not less than 0.0217 inch thick galvanized steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

D. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than 0.0336 inch (0.85 mm) thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.10 CONCRETE MIXES

A. Prepare design mixes for each type and strength of concrete determined by either laboratory trial mix or field test data bases, as follows:

1. Proportion normal-weight concrete according to ACI 211.1 and ACI 301.
2. Proportion lightweight structural concrete according to ACI 211.2 and ACI 301.

B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the laboratory trial mix basis.

C. Cementitious Materials: For concrete exposed to deicers, limit percentage, by weight, of cementitious materials other than portland cement according to ACI 301 requirements.

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

1. Combined Fly Ash and Pozzolan: 25 percent.

E. Maximum Water-Cementitious Materials Ratio: 0.55 for concrete required for foundations.

F. Maximum Water-Cementitious Materials Ratio: 0.45 for all floor slabs.

G. Maximum Water-Cementitious Materials Ratio: 0.50 for all other concrete.

H. Air Content Non Exposed Concrete: Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content of 2 to 4 percent, unless otherwise indicated.

I. Air Content Non Exposed Concrete: Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content as follows within a tolerance of plus 1 or minus 1.5 percent, unless otherwise indicated:

1. Air Content: 5.5 percent for 1-1/2-inch- nominal maximum aggregate size.
2. Air Content: 6 percent for 3/4-inch- nominal maximum aggregate size.

J. Do not air entrain concrete to trowel-finished interior floors and suspended slabs. Do not allow entrapped air content to exceed 3 percent.

K. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

L. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
2. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

2.11 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.12 CONCRETE MIXING

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

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.

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

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

D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.

1. Do not use rust-stained steel form-facing material.

E. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

F. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

G. Chamfer exterior corners and edges of permanently exposed concrete.

H. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

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

J. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

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

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use Setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor bolts, accurately located, to elevations required.
2. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
3. Install dovetail anchor slots in concrete structures as indicated.

3.3 REMOVING AND REUSING FORMS

A. General: Formwork, for sides of beams, walls, columns, and similar parts of the Work, that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete provided concrete is hard enough to not be damaged by form-removal operations and provided curing and protection operations are maintained.

B. Leave formwork, for beam soffits, joists, slabs, and other structural elements, that supports weight of concrete in place until concrete has achieved the following:

1. 28-day design compressive strength.
2. Determine compressive strength of in-place concrete by testing representative field- or laboratory-cured test specimens according to ACI 301.
3. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

C. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

D. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 SHORES AND RESHORES

A. Comply with ACI 318, ACI 301, and recommendations in ACI 347R for design, installation, and removal of shoring and reshoring.

B. In multistory construction, extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be loaded above its allowable design load.

C. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.5 VAPOR BARRIER

A. General: Place, protect, and repair vapor-barrier sheets according to ASTM E 1643 and manufacturer's written instructions. Where inconsistencies occur between ASTM E 1643 and the manufacturer's written instructions, conform to the manufacturer's instructions.

B. Installation

1. Level and tamp or roll granular fill
2. Place vapor barrier sheeting with the longest dimension parallel with the direction of the conrete pour.
3. Lap vapor barrier over footings or seal to foundation wall, or both, and seal around penetrations such as utilities and columns in order to create a monolithic membrane between the surface of the slab and moisture sources below the slab and a the slab perimeter.
4. Lap joints 6" or as instructed by the manufacturer, and seal with the manufacturer's recommended adhesive or pressure sensitive tape or both
5. Turn up vapor barrier at all slab penetrations.

C. Protection

1. Take precautions to protect vapor barrier from damage during installation of reinforcing steel and utilities and during placement of concrete.

2. Use only concrete type brick reinforcing bar supports, or provided 6 inch by 6 inch protective pads of asphaltic hardboard or other material recommended by the vapor barrier manufacturer to protect the vapor barrier from puncture.
3. Avoid use of stakes driven through vapor barrier.

D. Repair

1. Repair vapor barrier damaged during the placement of reinforcing steel or concrete with vapor barrier material or as instructed by the manufacturer.
2. Lap beyond damaged areas a minumum of 6 inches and seal as prescribed for sheet joints.

3.6 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire fabric in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.7 JOINTS

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

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Engineer.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated.
2. Form from preformed galvanized steel, plastic keyway-section forms, or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
6. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, as follows:

1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/4-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface. Do not wait overnight before cutting joints.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.

E. Dowel Joints: Install dowel sleeves and dowels or dowel bar and support assemblies at joints where indicated.

1. Use dowel sleeves or lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.8 WATERSTOPS

A. Flexible Waterstops: Install in construction joints as indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of Work. Field-fabricate joints in waterstops according to manufacturer's written instructions.

B. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, bonding or mechanically fastening and firmly pressing into place. Install in longest lengths practicable.

3.9 CONCRETE PLACEMENT

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

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

C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation.

1. Consolidate placed concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.
2. Do not use vibrators to transport concrete inside forms.

D. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.

2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.
5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, free of humps or hollows, before excess moisture or bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

E. Cold-Weather Placement: Comply with ACI 306.1.

F. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R:

3.10 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding ACI 347R limits for class of surface specified.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch in height.

1. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, or painting.
2. Do not apply rubbed finish to smooth-formed finish.

C. Rubbed Finish: Apply the following to smooth-formed finished concrete:

1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces 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.

3.11 FINISHING FLOORS AND SLABS

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

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

1. Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

C. Trowel Finish: After applying float finish, apply first trowel finish and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system

2. Finish surfaces to the tolerances noted on drawings, measured within 24 hours according to ASTM E 1155 for a randomly trafficked floor surface.

D. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.12 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete Work.

B. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

C. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel-finish concrete surfaces.

3.13 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with recommendations in ACI 305R for hot-weather protection during curing.

B. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing by one or a combination of the following methods:

C. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

a. Water.
b. Continuous water-fog spray.
c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

   a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
   b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
   c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer recommends for use with floor coverings.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.14 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before

bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4 inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

3.15 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement according to requirements specified in this Article.

B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mix exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
6. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of four standard cylinder specimens for each composite sample.

    a. Cast and field cure one set of five standard cylinder specimens for each composite sample.

7. Compressive-Strength Tests: ASTM C 39; test two laboratory-cured specimens at 7 days and two at 28 days.

    a. Test two field-cured specimens at 7 days and two at 28 days.
    b. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at age indicated.

C. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.

D. Strength of each concrete mix will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

E. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests.

F. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

G. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Architect.

END OF SECTION 03 3000

SECTION 05-1200
STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Structural steel.
2. Grout.

B. Related Sections include the following:

1. Division 1 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.
2. Division 5 Section "Steel Deck" for field installation of shear connectors.
3. Division 5 Section "Metal Fabrications" for miscellaneous steel fabrications and other metal items not defined as structural steel.

1.3 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges," that support design loads.

B. Architecturally Exposed Structural Steel: Structural steel designated as architecturally exposed structural steel in the Contract Documents.

1.4 PERFORMANCE REQUIREMENTS

A. Connections: Provide details of simple shear connections required by the Contract Documents to be selected or completed by structural-steel fabricator to withstand ASD-service loads indicated and comply with other information and restrictions indicated.

1. Select and complete connections using schematic details indicated and AISC's "Manual of Steel Construction, Allowable Stress Design," Part 4.
2. Engineering Responsibility: Fabricator's responsibilities include using a qualified professional engineer to prepare structural analysis data for structural-steel connections.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
4. Indicate number and spacing of shear stud connectors.
5. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
6.. For structural-steel connections indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
7. Do not reproduce contract documents for use as shop drawings.

C. Welding certificates.

D. Qualification Data: For fabricator .

E. Mill Test Reports: Signed by manufacturers certifying that the following products comply with requirements:

1. Structural steel including chemical and physical properties.
2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
3. Direct-tension indicators.
4. Tension-control, high-strength bolt-nut-washer assemblies.
5. Shear stud connectors.
6. Nonshrink grout.

F. Source quality-control test reports.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator who participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant.

B. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."

C. Comply with applicable provisions of the following specifications and documents:

1. AISC's "Code of Standard Practice for Steel Buildings and Bridges."
2. AISC's "Seismic Provisions for Structural Steel Buildings" and "Supplement No. 2."
3. AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
4. AISC's "Specification for the Design of Steel Hollow Structural Sections."

5. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from erosion and deterioration.

1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
2. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.8 COORDINATION

A. Furnish anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: ASTM A 992.

B. Channels, Angles: ASTM A 36.

C. Plate and Bar: ASTM A 36.

D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B.

E. Steel Pipe: ASTM A 53, Type E or S, Grade B.

F. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.

1. Finish: Plain.
2. Direct-Tension Indicators: ASTM F 959, Type 325 compressible-washer type.

a. Finish: Plain.

B. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, round head steel structural bolts with splined ends; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.

1. Finish: Plain.

C. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1, Type B.

D. Headed Anchor Bolts: ASTM F 1554, Grade 36.

1. Nuts: ASTM A 563 heavy hex carbon steel.
2. Plate Washers: ASTM A 36 carbon steel.
3. Washers: ASTM F 436 hardened carbon steel.
4. Finish: Plain

2.3 PRIMER

A. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer.

2.4 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. No field fabrication of struutral steel allowed. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."

1. Camber structural-steel members where indicated.
2. Identify high-strength structural steel according to ASTM A 6 and maintain markings until structural steel has been erected.
3. Mark and match-mark materials for field assembly.
4. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1.

C. Bolt Holes: Drill or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 1, "Solvent Cleaning SSPC-SP 2, "Hand Tool Cleaning or SSPC-SP 3, "Power Tool Cleaning."

F. Holes: Provide holes required for securing other work to structural steel and for passage of other work through steel framing members.

1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
2. Base-Plate Holes: Drill or punch holes perpendicular to steel surfaces.

2.6 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Pretensioned unless otherwise noted on drawings.

B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

2. At exposed welded connections in steel tube framing at canpopies, Grind welds smooth.

2.7 SHOP PRIMING

A. Shop prime steel surfaces except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
2. Surfaces to be field welded.
3. Surfaces to be high-strength bolted with slip-critical connections.
4. Surfaces to receive sprayed fire-resistive materials.
5. Galvanized surfaces.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to one of the following specifications and standards:

1. SSPC-SP 2, "Hand Tool Cleaning."
2. SSPC-SP 3, "Power Tool Cleaning."

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

2.8 GALVANIZING

A. Hot-Dip Galvanized Finish: Where noted on drawings, apply zinc coating by the hot-dip process to structural steel according to ASTM A 123.

1. Fill vent holes and grind smooth after galvanizing.
2. Galvanize lintels and shelf angles located in exterior walls.

2.9 SOURCE QUALITY CONTROL

A. Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.

1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.

B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

C. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1 and the following inspection procedures, at testing agency's option:

1. Liquid Penetrant Inspection: ASTM E 165.
2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
3. Ultrasonic Inspection: ASTM E 164.
4. Radiographic Inspection: ASTM E 94.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments, with steel erector present, for compliance with requirements.

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

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated.

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design. "

B. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.

1. Set base and bearing plates for structural members on wedges, shims, or setting nuts as required.
2. Snug-tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base or bearing plate before packing with grout.
3. Promptly pack grout solidly between bearing surfaces and base or bearing plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

E. Splice members only where indicated.

F. Do not use thermal cutting during erection unless approved by Engineer. Finish thermally cut sections within smoothness limits in AWS D1.1.

G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Pretensioned unless othereise on drawings.

B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

1. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design" for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.
3. At exposed welded connections at canopies, grind welds smooth.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.

B. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Welded Connections: Field welds will be visually inspected according to AWS D1.1.

1. In addition to visual inspection, field welds will be tested according to AWS D1.1 and the following inspection procedures, at testing agency's option:

    a. Liquid Penetrant Inspection: ASTM E 165.
    b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
    c. Ultrasonic Inspection: ASTM E 164.
    d. Radiographic Inspection: ASTM E 94.

D. Shear connector stud welds will be inspected and tested according to AWS D1.1 for stud welding and as follows:

1. Shear connector stud welds will be visually inspected.
2. Bend tests will be performed if visual inspections reveal less than a full 360-degree flash or welding repairs to any shear connector stud.
3. Revise subparagraph below if an actual number or a percentage of shear connector studs requires testing.
4. Tests will be conducted on additional shear connector studs if weld fracture occurs on shear connector studs already tested according to AWS D1.1.

E. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

3.6 REPAIRS AND PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories**,** bearing plates, and abutting structural steel.

1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

END OF SECTION 05-1200

SECTION 05-3100
STEEL DECK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Cellular roof deck.

B. Related Sections include the following:

1. Division 3 Section "Cast-in-Place Concrete" for concrete fill and reinforcing steel.
2. Division 3 Section "Insulating Concrete Decks" for lightweight insulating concrete fill.
3. Division 5 Section "Metal Fabrications" for framing deck openings with miscellaneous steel shapes.
4. Division 9 Section "Painting" for repair painting of painted deck.

1.3 SUBMITTALS

A. Product Data: For each type of deck, accessory, and product indicated.

1. The location and manufacture of all steel must be included in product data with the goal of limiting these locations to within 500 miles of project site.
2. All steel that contains recycled material must be noted in the product data the goal of achieving 60% - 70% recycled materials.

B. Shop Drawings: Show layout and types of deck panels, anchorage details, reinforcing channels, pans, deck openings, special jointing, accessories, and attachments to other construction.

C. Product Certificates: Signed by steel deck manufacturers certifying that products furnished comply with requirements.

D. Welding Certificates: Copies of certificates for welding procedures and personnel.

E. Product Test Reports: From a qualified testing agency indicating that each of the following complies with requirements, based on comprehensive testing of current products:

1. Mechanical fasteners.

1.4 QUALITY ASSURANCE

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

B. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.

C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."

D. AISI Specifications: Calculate structural characteristics of steel deck according to AISI's "Specification for the Design of Cold-Formed Steel Structural Members."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Steel Deck:

a. Consolidated Systems, Inc.
b. Nucor Corp.; Vulcraft Div.
c. Wheeling Corrugating Co.; Div. of Wheeling-Pittsburgh Steel Corp.

2.2 CELLULAR ROOF DECK

A. Cellular Steel Roof Deck: Fabricate steel sheet cellular roof deck panels, consisting of a ribbed top hat section welded to a lower flat-bottom plate with self-aligning and concealed sidelap fasteners, to comply with "SDI Specifications and Commentary for Long Span Cellular Steel Roof Deck" in SDI Publication No. 31, and with the following:

1. Galvanized and Shop-Primed Steel Sheet: ASTM A 653/A. Structural Steel (SS), Grade 33 minimum, ASTM A 924/A 924M G90 zinc coating. Primer at top of deck hat section: SCi Metal Dek Group weldable gray.

2. Deck Profile: Type N

3. Profile Depth: 3 inches.

4. Design Uncoated-Steel Thicknesses; Deck Unit/Bottom Plate: See Drawings

5. Span Condition: Triple span or more.

6. Side Laps: Self-aligning with concealed sidelap fastener..

2.3 ACCESSORIES

A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.

C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.

D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.

E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.

F. Steel Sheet Accessories: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.

L. Galvanizing Repair Paint: ASTM A 780.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

3.2 INSTALLATION, GENERAL

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 29, manufacturer's written instructions, and requirements in this Section.

B. Install temporary shoring before placing deck panels, if indicated on drawings.

C. Locate decking bundles to prevent overloading of supporting members.

D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.

E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.

F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to decking.

G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of decking, and support of other work.

H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

I. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

3.3 ROOF DECK INSTALLATION

A. Fasten roof deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter, but not less than 1-1/2 inches (38 mm) long, and as follows:

1. Weld Diameter: 5/8 inch, nominal.
2. Weld Spacing: Weld edge and interior ribs of deck units with a minimum of four welds per deck unit at each support. Space welds as indicated on drawings.
3. Weld Washers: Install weld washers at each weld location for deck thinner than 22-gage.

B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports as noted on drawings.

C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches (38 mm), with end joints as follows:

1. End Joints: Lapped 2 inches minimum.

D. Roof Sump Pans and Sump Plates: Install over openings provided in roof decking and weld flanges to top of deck. Space welds not more than 12 inches (305 mm) apart with at least 1 weld at each corner.

E. Miscellaneous Roof Deck Accessories: Install ridge and valley plates, finish strips, cover plates, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld to substrate to provide a complete deck installation.

F. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive according to manufacturer's written instructions to ensure complete closure.

G. Sound-Absorbing Insulation: Istall into topside ribs of deck.

3.4 FIELD QUALITY CONTROL

A. Testing: Owner will engage a qualified independent testing agency to perform field quality control testing.

B. Field welds will be subject to inspection.

C. Testing agency will report test results promptly and in writing to Contractor and Architect.

D. Remove and replace work that does not comply with specified requirements.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.5 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 31 00

SECTION 31-2300.13
FOUNDATION EXCAVATION AND BACKFILLING

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 this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Preparing of subgrade for foundations and 5 feet from building.

2. Drainage fill course for support of building slabs is included as part of this work.

3. Excavating and backfilling of trenches within building lines.

B. Excavating and Backfilling for Mechanical/Electrical Work: Refer to Mechanical and Electrical Sections for excavation and backfill required in conjunction with underground mechanical and electrical utilities and buried mechanical and electrical appurtenances.

1.3 DEFINITIONS

A. Excavation consists of removal of material encountered to subgrade elevations indicated and subsequent disposal of materials removed.

B. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be at Contractor's expense.

C. Additional Excavation: When excavation has reached required subgrade elevations, notify Geotechnical Engineer, who will make an inspection of conditions. If Geotechnical Engineer determines that bearing materials at required subgrade elevations are unsuitable, continue excavation until suitable bearing materials are encountered. The Contract Sum may be adjusted by an appropriate Contract Modification.

D. Subgrade: The undisturbed earth or the compacted soil layer immediately below granular sub-base, drainage fill, or topsoil materials.

E. Structure: Buildings, foundations, slabs, tanks, curbs or other man-made stationary features occurring above or below ground surface.

1.4 QUALITY ASSURANCE

A. Codes and Standards: Perform excavation work in compliance with applicable requirements of authorities having jurisdiction.

B. Testing and Inspection Service: Owner will employ and pay for a qualified independent geotechnical testing and inspection laboratory to perform soil testing and inspection service during earthwork operations.

1.5 PROJECT CONDITIONS

A. Site Information: Data in subsurface investigation reports (R & M Engineering, Inc. report 101179 dated December 15, 2010) was used for the basis of the design and are available to the Contractor for information only. Conditions are not intended as representations or warranties of accuracy or continuity between soil borings. The Owner will not be responsible for interpretations or conclusions drawn from this data by Contractor.

1. Additional test borings and other exploratory operations may be performed by Contractor, at the Contractor's option; however, no change in the Contract Sum will be authorized for such additional exploration.

B. Existing Utilities: Locate existing underground utilities in areas of excavation work. If utilities are indicated to remain in place, provide adequate mans of support and protection during earthwork operations.

1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult with utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

2. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shutoff of services if lines are active.

C. Use of Explosives: Use of explosives is not permitted.

D. Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights.

E. Operate warning lights as recommended by authorities having jurisdiction.

F. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Shot Rock Fill: Well graded shot rock approved by the geotechnical engineer.

B. Select Fill: N.F.S. Select Borrow Material shall consisit of sand, gravel, fractured rock or combination thereof containing no muck, frozen material, roots or other deleterious materials. The material shall have a plasticity index not greater than 6 as determined by AASHTO T90 and shall contain no more than 6% passing the #200 seive based on material that passes a 3 inch screen

PART 3 - EXECUTION

3.1 EXCAVATION

A. Remove existing pavements, buildings, vegitation, roots, topsoil, debris and unsuitable fill including all organic soil (peat). Note that depths of organic soil vary from 1.5' to 11.5' in the building footprint.

B. Care must be taken to protect the bearing soils from excessive disturbance by workmen or equipment, or ponding and saturation from precipitation.

C. The excavation bottom must be kept dry. Large areas of exposure must be protected. Should surficial disturbance become unavoidable, cover the soil bearing with a 2" to 4" layer of non-frost-susceptible, free draining gravel.

3.2 STABILITY OF EXCAVATIONS

A. General: Comply with local codes, ordinances, and requirements of agencies having jurisdiction.

B. Slope sides of excavations to comply with local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

3.3 DEWATERING

A. Prevent surface water and subsurface or groundwater from flowing into excavations and from flooding project site and surrounding area.

1. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting grade beams or footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.

2. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or runoff areas. Do not use trench excavations as temporary drainage ditches.

3.5 COLD WEATHER PROTECTION

A. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.

3.6 BACKFILL AND FILL

A. General: Place soil material in layers to required subgrade elevations, for each area classification listed below, using materials specified in Part 2 of this Section.

B. Backfill excavations as promptly as work permits, but not until completion of the following:

1. Acceptance of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.

2. Inspection, testing, approval, and recording locations of underground utilities have been performed and recorded.

3. Removal of concrete formwork.

4. Removal of shoring and bracing, and backfilling of voids with satisfactory materials.

5. Removal of trash and debris from excavation.

6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.

3.7 PLACEMENT AND COMPACTION

A. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.

B. Place shot rock fill to -12". Compact with a vibratory grid roller (minimum centrifugal force shall be 50,000 pounds) with a minum of 8 passes prior to placement of subsequent lifts. Initial lift shall be 24" thick. Subsequent lifts shall be 12: thick.

C. Place one 12" lift of N.F.S.select borrow material (3" minus) compacted as noted below. This material shall be placed up to the bottom of footings.

D. Edges of complacted fill should extend at least 10 feet beyond the building prior to sloping.

D. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

E. Place backfill and fill materials evenly adjacent to structures, piping, or conduit to required elevations. Prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping, or conduit to approximately same elevation in each lift.

F. Existing subgrade, control soil and fill compaction, providing minimum percentage of density specified for each area classification indicated below. Correct improperly compacted areas or lifts as directed by Architect if soil density tests indicate inadequate compaction.

1. Percentage of Maximum Density Requirements: Compact N.F.S. select borrow material to 95% of maximum dry density as determined by ASTM D-1557 (Modified Proctor). To determine the proctor value of this material, the material passing the ¾" sieve is taken and correction is applied to the course fraction (+3/4" material)..

2. Moisture Control: Where subgrade or layer of fill material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade or layer of soil material. Apply water in minimum quantity as necessary to prevent free water from appearing on surface during or subsequent to compaction operations.

    a. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.

    b. Stockpile or spread soil material that has been removed because it is too wet to permit compaction. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value.

3.8 EXCAVATION AND FOR FOUNDATIONS

A. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 foot, and extending a sufficient distance from grade beams, footings and foundations to permit placing and removal of concrete formwork, installation of services, and other construction and for inspection.

1. Excavations for foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other work.

2. Where the removal and replacement of unsuitable bearing material is required beneath a footing foundation, the excavation must extend laterally at least eight (8) inches for each foot of backfill below the foundation base.

3.9 GRADING

A. General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated or between such points and existing grades.

B. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes and as follows:

C. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.

3.10 FIELD QUALITY CONTROL

A. Quality Control Testing During Construction: Allow testing service to inspect and approve each subgrade and fill layer before further backfill or construction work is performed.

1. Where required, perform field density tests in accordance with ASTM D 698.

    a. Field density tests may also be performed by the nuclear method in accordance with ASTM D 2922, providing that calibration curves are periodically checked and adjusted to. In conjunction with each density

calibration check, check the calibration curves furnished with the moisture gages in accordance with ASTM D 3017.

b. If field tests are performed using nuclear methods, make calibration checks of both density and moisture gages at beginning of work, on each different type of material encountered, and at intervals as directed by the Architect.

2. Foundation Wall Backfill: Perform at least two field density tests at locations and elevations as directed.

3. If in opinion of Architect, based in testing service reports and inspection, subgrade or fills that have been placed are below specified density, perform additional compaction and testing until specified density is obtained.

3.11 EROSION CONTROL

A. Provide erosion control methods in accordance with requirements of authorities having jurisdiction.

3.12 MAINTENANCE

A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

B. Repair and reestablish grades in settled, eroded, and rutted areas to specified tolerances.

C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction, operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.

3.13 DISPOSAL OF EXCESS AND WASTE MATERIALS

A. Removal from Owner's Property: Remove waste materials, including unacceptable excavated material, trash, and debris, and dispose of it off Owner's property.

END OF SECTION 31-2300.13