

1.0 - GENERAL REQUIREMENTS

1.1 Related Documents

Drawings and General Provisions of Contract, including General and Supplementary Conditions (plus modifications thereto), and other Division 1 Specification Sections, apply to work of this Section.

1.2 Description of Requirements

A. Definition

"Cutting and patching" includes cutting into existing construction to provide for the installation or performance of other work and subsequent fitting and patching required to restore surfaces to their original condition.

1. "Cutting and patching" is performed for coordination of the work, to uncover work for access or inspection, to obtain samples for testing, to permit alterations to be performed or for other similar purposes.
2. Cutting and patching performed during the initial fabrication, erection or installation processes is not considered to be "cutting and patching" under this definition. Drilling of holes to install fasteners and similar operations are also not considered to be "cutting and patching".

- B. Refer to other sections of these specifications for specific cutting and patching requirements and limitations applicable to individual units of work.

Unless otherwise specified, requirements of this section apply to mechanical and electrical work. Refer to Division 15 and Division 16 Sections for additional requirements and limitations on cutting and patching of mechanical and electrical work.

1.3 Quality Assurance

A. Requirements for Structural Work

Do not cut and patch structural work in a manner that would result in a reduction of load-carrying capacity or of load-deflection ratio.

- B. Before cutting and patching the following categories of work, obtain the Architect / Engineer's approval to proceed with cutting and patching as described in the procedural proposal for cutting and patching.

1. Structural steel.
2. Miscellaneous structural metals, including lintels, equipment supports, stair systems and similar categories or work.
3. Structural concrete.
4. Bearing walls.
5. Structural decking.
6. Exterior wall construction.
7. Piping, ductwork, vessels and equipment.
8. Structural systems of special construction, as specified by Division 13 Sections.

C. Operational and Safety Limitations

Do not cut and patch operational elements or safety related components in a manner that would result in a reduction of their capacity to perform in the manner intended, including energy performance, or that would result in increased maintenance, or decreased operational life or decreased safety.

D. Before cutting and patching the following elements of work, and similar work elements where directed, obtain the Owner's approval through the Architect / Engineer to proceed with cutting and patching as proposed in the proposal for cutting and patching. Note fourteen (14) day prior notice requirement of Owner.

1. Primary operational systems and equipment.
2. Noise and vibration control elements and systems.
3. Control, communication, conveying and electrical wiring systems.

E. Visual Requirements

Do not cut and patch work exposed on the building's exterior or in its occupied spaces in a manner that would, in the Architect's opinion, result in lessening the building's aesthetic qualities. Do not cut and patch work in a manner that would result in substantial visual evidence of cut and patch work. Remove and replace work judged by the Architect to be cut and patched in a visually unsatisfactory manner.

1.4 Submittals

A. Procedural Proposal for Cutting and Patching

Where prior approval of cutting and patching is required, submit proposed procedures for this work well in advance of the time work will be performed and request approval to proceed. Include the following information, as applicable, in the submittal:

1. Describe nature of the work and how it is to be performed, indicating why cutting and patching cannot be avoided. Describe anticipated results of the work in terms of changes to existing work, including structural, operational and visual changes as well as other significant elements.
2. List products to be used and firms that will perform work.
3. Give dates when work is expected to be performed.
4. List utilities that will be disturbed or otherwise be affected by work, including those that will be relocated and those that will be out-of-service temporarily. Indicate how long utility service will be disrupted. Request day and time desired for disruption of services.
5. Where cutting and patching structural work involves the addition of reinforcement, submit details and engineering calculations to show how that reinforcement is integrated with original structure to satisfy requirements.
6. Approval by the Architect / Engineer to proceed with cutting and patching work does not waive the Architect / Engineer's right to later require complete removal and replacement of work found to be cut and patched in an unsatisfactory manner.

2.0 - PRODUCTS

2.1 Materials

Except as otherwise indicated, or as directed by the Architect / Engineer, use materials for cutting and patching that are identical to existing materials. If identical materials are not available, or cannot be used, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials for cutting and patching that will

result in equal-or-better performance characteristics.

3.0 - EXECUTION

3.1 Inspection

- A. Before cutting, examine the surfaces to be cut and patched and the conditions under which the work is to be performed. If unsafe or otherwise unsatisfactory conditions are encountered, take corrective action before proceeding with the work.
- B. Before the start of cutting work, meet at the work site with all parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict between the various trades. Coordinate layout of the work and resolve potential conflicts before proceeding with the work.
- C. Where new work is indicated to interface with an existing roofing system or other systems potentially under current warranty, the Contractor shall coordinate as required to verify and provide new work in such manner and with such resources as to maintain the Owners current warranty accordingly without compromise.

3.2 Preparation

- A. Temporary Support
To prevent failure, provide temporary support of work to be cut.
- B. Protection
 - 1. Protect other work during cutting and patching to prevent damage. Provide protection from adverse weather conditions for that part of the project that may be exposed during cutting and patching operations.
 - 2. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- C. Take precautions not to cut existing pipe, conduit or duct serving the building but scheduled to be relocated until provisions have been made to bypass them.

3.3 Performance

- A. General
Employ skilled workmen to perform cutting and patching work. Except as otherwise indicated or as approved by the Architect / Engineer, proceed with cutting and patching at the earliest feasible time and complete work without delay.
- B. Cutting
 - 1. Cut the work using methods that are least likely to damage work to be retained or adjoining work. Where possible, review proposed procedures with the original installer; comply with original installer's recommendations.
 - 2. In general, where cutting is required, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut through concrete and masonry using a cutting machine such as a Carborundum saw or core drill to insure a neat hole. Cut holes and slots neatly to size required with minimum disturbance of adjacent work. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces. Temporarily cover openings when not in use.
 - 3. By-pass utility services such as pipe and conduit, before cutting, where such utility services are shown or required to be removed, relocated or abandoned. Cut-off conduit and pipe in walls or partitions to be removed. After by-pass and cutting, cap, valve or plug and seal tight remaining portion

of pipe and conduit to prevent entrance of moisture or other foreign matter.

C. Patching

1. Patch with seams which are durable and as invisible as possible. Comply with specified tolerances for the work.
2. Where feasible, inspect and test patched areas to demonstrate integrity of work.
3. Restore exposed finishes of patched areas and, where necessary, extend finish restoration into retained adjoining work in a manner which will eliminate evidence of patching and refinishing.
4. Where removal of walls or partitions extends one finished area into another finished area, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. If necessary to achieve uniform color and appearance, remove existing floor and wall coverings and replace with new materials.
5. Where patch occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing patch, after patched area has received prime and base coat.
6. Patch and repair existing plaster / gypsum board ceilings as necessary to provide an even plane surface of uniform appearance.

3.4 Cleaning

Thoroughly clean areas and spaces where work is performed or used as access to work. Remove completely paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION

TEMPORARY FACILITIES AND CONTROLS - SECTION 01200

1.0 GENERAL REQUIREMENTS

Temporary facilities and controls required for this project include, but are not necessarily limited to, the following:

1.1 Temporary Structures (Optional)

- A. Provide and maintain field office separate from the project of not more than 300 sq. ft. in area.
- B. The entire facility, including furniture, will remain the property of the Contractor and shall be removed from the site by completion of the Work.
- C. Portable office or trailer shall meet all appropriate regulation and local approval.

1.2 Temporary Facilities

- A. Temporary water and electrical service connections will be provided by General Contractor. This Contractor shall make necessary connections and provide conductors and furnish and install area distribution boxes so located that the individual trades may use 30m (100') maximum length extension cords to obtain adequate power and artificial lighting at all points where required for the Work, and for inspection and safety.
- B. Cost of temporary water and electric connections and conductors shall be borne by Contractor.
- C. Provide temporary toilets in portable units. Toilets must meet standards of the County Public Health Department. Toilets shall be maintained for the duration of the project.
- D. Remove temporary utilities on completion of construction.

1.3 Temporary Scaffolds, Lifts, Staging and Stairs

Provide scaffolds, lifts, staging, stairs, ramps, ladders, runways, platforms, hoists and guard rails necessary for execution of construction. Comply with recognized safety rules and prevailing laws or ordinances. Remove on completion of construction.

1.4 Protective Barricades and Temporary Walkways

- A. Contractor to provide and maintain all necessary temporary barricades, covers, enclosing fences, walkways, scaffolds, guards, street barricades, etc., in accordance with requirements of SPECIAL PROJECT REQUIREMENTS - SECTION 01030. Height and location to be in compliance with local codes and ordinances. Provide adequate warning signs and warning lights.
- B. Materials for construction shall be substantial, sound, all of good appearance, straight, in line, unyielding, complete, well installed, braced and adequate for use intended. All to comply with requirements of local codes and ordinances including the International Building Code. Provide and install gates and doors in enclosing barricade as required.
- C. Remove upon completion of the work.

1.5 Construction Fence

- A. Provide 6'-0" high chain link fence around area of work, around staging area, and/or material storage area(s) as directed and/or as deemed necessary for safety. Fence shall be supported on steel posts and be free standing with panel stands.

Fence to be maintained in good condition throughout contract period. Remove fence when contract is completed and repair any site damage caused by fence and posts.

- B. Fence adjacent to pedestrian and traffic areas as required to safely maintain ongoing school operations subject to the Site Limits and approval of the Owner and the Architect.
- C. Provide lockable gates (truck gates and pedestrian gate as required). Locate at Contractor's option. Keep gates closed except during actual ingress and egress.
- D. Route fence in behind existing fire hydrants to keep available from street side at all times.
- E. Coordinate fence location with Owner prior to installation of fencing and gates. Fencing and gates shall not obstruct the Owner's daily operation of pedestrian, bus, and or car traffic.

1.6 Protection

Conform to requirements of "Safety & Protection of Persons and Property", in GENERAL CONDITIONS.

1.7 Maintaining Traffic

- A. Do not close or obstruct streets, sidewalks, alleys and passageways without permit. Do not place or store material in streets, alleys or passageways.
- B. Conduct operations with minimum interference to roads, streets, driveways, alleys, sidewalks and facilities, except as noted herein.
- C. Provide, erect and maintain lights, barriers and the like required by traffic regulations or local laws.

1.8 Protection of Structure and Property

- A. Execute work to ensure adjacent property against damages which might occur from falling debris or other cause; do not interfere with use of adjacent property. Maintain free, safe passage to and from same.
- B. Take precautions to guard against movement, settlement or collapse of any sidewalks or street passages adjoining property; be liable for any such movement, settlement or collapse; repair promptly such damage when so ordered.

1.9 Project Signs

Allow no signs or advertising of any kind on the job site except as specifically approved in advance by the Architect.

1.10 Maintenance and Removal

Maintain all temporary facilities and controls as long as needed for the safe and proper completion of the Work. Remove all such temporary facilities and controls as rapidly as progress of the Work will permit, or as directed by the Architect.

END OF SECTION

1.0 - GENERAL REQUIREMENTS

1.1 Related Documents

Drawings and general provisions of Contract, including General and Supplementary (Special) Conditions, and modifications thereto, and other Division 1 Specifications Sections, apply to work of this Section. See Special Project Requirements Section 01030 for pre-installation meetings and pre-finishes meeting.

1.2 Description of Requirements

A. General

Required inspection and testing services are intended to assist in the determination of probable compliance of the work with requirements specified or indicated. These required services do not relieve the Contractor of responsibility for compliance with these requirements or for compliance with requirements of the Contract Documents.

B. Definitions

The requirements of this section relate primarily to customized fabrication and installation procedures, not to the production of standard products. Quality control services include inspections and tests and related actions including reports performed by independent agencies and governing authorities, as well as directly by the Contractor. These services do not include Contract enforcement activities performed directly by the Architect or Engineer.

1. Specific quality control requirements for individual units of work are specified in the sections of these specifications that specify the individual element of the work. These requirements, including inspections and tests, cover both production of standard products and fabrication of customized work. These requirements also cover quality control of the installation procedures.
2. Inspection, tests and related actions specified in this section and elsewhere in the Contract Documents are not intended to limit the Contractor's own quality control procedures which facilitate overall compliance with requirements of the Contract Documents.
3. Requirements for the Contractor to provide quality control services as required by the Architect / Engineer, the Owner, governing authorities or other authorized entities are not limited by the provisions of this section.

1.3 Responsibilities

A. Testing

Owner shall employ and pay for testing services except where tests are specifically indicated as being the contractor's responsibility.

B. Re-Test Responsibilities

Where results of required inspections, tests or similar services prove unsatisfactory and do not indicate compliance or related work with the requirements of the Contract Documents, then re-tests are the responsibility of the Contractor, regardless of whether the original test was the Contractor's responsibility. Re-testing of work revised or replaced by the Contractor is the Contractor's responsibility, where required tests were performed on original work.

C. Responsibility for Associated Services

The Contractor is required to cooperate with the independent agencies performing required inspections, tests and similar services. Provide such auxiliary services as are reasonably requested. Notify the testing agency sufficiently in advance of operations to permit assignment of personnel. These auxiliary services include, but are not necessarily limited to, the following:

1. Providing access to the work.
2. Taking samples or assistance with taking samples.
3. Delivery of samples to test laboratories.
4. Security and protection of samples and test equipment at the project site.

D. Coordination

The Contractor and each independent agency engaged to perform inspections, tests and similar services for the project shall coordinate the sequence of their activities so as to accommodate required services with a minimum of delay in the progress of the work. In addition, the Contractor and each independent testing agency shall coordinate their work so as to avoid the necessity of removing and replacing work to accommodate inspections and tests. The Contractor is responsible for scheduling times for inspections, tests, taking of samples and similar activities.

1.4 Quality Assurance

Qualification for Service Agencies: Except as otherwise indicated, engage inspection and test service agencies, including independent testing laboratories, which are pre-qualified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories, and which are recognized in the industry as specialized in the types of inspections and tests to be performed.

1.5 Submittals

A. General

Refer to Division - 1 Section of "Submittals" for the general requirements on submittals. Submit a certified written report of each inspection, test or similar service, directly to the Architect / Engineer, in duplicate, unless the Contractor is responsible for the service. If the Contractor is responsible for the service, submit a certified written report of each inspection, test or similar service through the Contractor, in duplicate. Submit additional copies of each written report directly to the governing authority, when the authority so directs.

B. Report Data

Written reports of each inspection, test or similar service shall include, but not be limited to, the following:

1. Name of testing agency or test laboratory.
2. Dates and locations of samples and tests or inspections.
3. Names of individuals making the inspection or test.
4. Designation of the work and test method.
5. Complete inspection or test data.
6. Test results.
7. Interpretations of test results.
8. Notation of significant ambient conditions at the time of sample-taking and testing.
9. Comments or professional opinion as to whether inspected or tested work complies with requirements of the Contract Documents.
10. Recommendations on re-testing, if applicable.

2.0 - PRODUCTS

Not applicable.

3.0 - EXECUTION

3.1 Repair and Protection

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

END OF SECTION

1.0 - GENERAL

- A. Summary: Shop drawings may be transmitted for approval by electronic format or by hard copies.

1. Digital Copies:

- a. Shop drawing and product data submittals shall be transmitted to Architect's office in electronic (PDF) format via email at **submittals@lathanassociates.com**. Do not email or copy transmittals to Architect or engineer.
- b. The intent of electronic submittals is to expedite the construction process by reducing paperwork and improving information flow.
- c. **The electronic submittal process is not intended for color samples, color charts, or physical material samples.**
- d. After receiving approved digital submittals, **General Contractor is responsible for printing and delivering 2 hard copies of the approved shop drawings to the Architect within 10 days.** Submittals are not considered complete until 2 copies have been received by the Architect. This may have a direct effect on pay requests or final payment.
- e. The Architect will retain the two (2) hard copies of shop drawing submittals: one for project records, and one to be incorporated with Close-Out Documents for the Owner.
- f. Prior to submitting electronic submittals, GC must sign electronic submittal agreement. Project will be either all electronic or all hard copy. We will not accept electronic submittals once we have begun with hard copies. A copy of this agreement is attached to this section.

DIGITAL file name shall include Architect Job No, Specification Section number and description. (e.g., 15-01, 06100 - Rough Carpentry). We will not accept files that are randomly named. (e.g. scan 1234 or from Xerox Copier, etc.) Digital submittals must still be stamped approved or approved as noted.

B. Submittal Procedures:

1. Coordinate submittals preparation with construction, fabrication, other submittals and activities that require sequential operations. Transmit in advance of construction operations to avoid delay.
2. Coordinate submittals for related operations to avoid delay because of the need to review submittals concurrently for coordination. The Architect reserves the right to withhold action on a submittal requiring coordination until related submittals are received.
3. Processing: General Contractor must review and approve shop drawings and submittals prior to submitting to Architect. Allow the Architect no less than three (3) weeks for initial review. Allow more time if the Architect must delay processing to permit coordination with the sequence of construction, related specification divisions and finishes to be selected in comparison, engineers, consultants and owner's representatives. Allow no less than two (2) weeks for reprocessing.

NOTE: No extension of Contract Time and/or additional costs will be authorized because of failure to transmit submittals sufficiently in advance of the Work to permit processing.

4. Submittal Preparation: The following information must be included with each transmittal.
 - a. Date
 - b. Project name and architect's project number.
 - c. Name of the General Contractor and contact within company.
 - d. Subcontractor name.
 - e. Supplier name.
 - f. Description of item.
 - g. Specification Section and name of that section.
 - h. Name of the Manufacturer - Model / Style of Item.
 - i. Only project specific items should be sent.
5. Transmittal Letter: Transmit samples, etc. with form that contains Architect's Job name and number, Specification Number, Product Name, Manufacturer name and Model number. On the form, record requests for data and deviations from requirements.
6. Contractors Action/Approval

Include General Contractor's certification stamp that information has been checked and complies with requirements before submitting to architect. General Contractor's action stamp must include Approved or Approved as Noted.

Information received without the contractor's stamp will be returned without any action taken by engineer or architect.

C. Submittal Schedule:

1. After developing the Contractor's Construction Schedule, prepare a schedule of submittals. Submit at or before date of the Pre-Construction Conference.
2. Coordinate with a list of Subcontracts, Schedule of Values, List of Products and the Contractor's Construction Schedule.
3. Prepare the schedule in order by Section number. Provide the following information:
 - a. Date for first submittal.
 - b. Related Section number.
 - c. Submittal category (Shop Drawings, Product Data or Samples).
 - d. Name of the Subcontractor.
 - e. Description of the Work covered.
 - f. Date for the Architect's final approval.

D. Shop Drawings:

Submit newly prepared information drawn to scale. Indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information. Include the following information:

1. Dimensions.
2. Identification of products and materials included by sheet and detail number.
3. Compliance with standards.
4. Notation of coordination requirements.
5. Notation of dimensions established by field measurement.
6. Do not use Shop Drawings without an appropriate final stamp indicating action taken.
7. After receiving approved digital Shop Drawings, General Contractor is responsible for printing and delivering 2 hard copies of the approved shop drawings to the Architect within 10 days. Submittals are not considered complete until 2 copies

have been received by the Architect. This may have a direct effect on pay requests or final payment.

E. Product Data:

1. Collect Product Data into a single submittal for each element of construction. Mark each copy to show applicable choices and options. Where Product Data includes information on several products, mark copies to indicate applicable information.
2. Include the following information:
 - a. Manufacturer's printed recommendations.
 - b. Compliance with trade association standards.
 - c. Compliance with recognized testing agency standards.
 - d. Application of testing agency labels and seals.
 - e. Notation of dimensions verified by field measurement.
 - f. Notation of coordination requirements.
3. Submittals:
 - a. Unless noncompliance with Contract Documents is observed, the submittal serves as the final submittal.

ALL MANUFACTURED ITEMS THAT ARE STRUCTURAL IN NATURE SHALL BEAR THE SEAL OF A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF ALABAMA AND SUBMITTED FOR APPROVAL.

4. Distribution:
 - a. Furnish copies to Installers, Subcontractors, Suppliers and others required for performance of construction activities.
 - b. Do not use unmarked Product Data for construction.

F. Samples:

1. Submit samples as required/requested and for color/texture finish selections.
2. Include the following:
 - a. Specification Section number and reference.
 - b. Generic description of the Sample.
 - c. Sample source.
 - d. Product name or name of the Manufacturer.
 - e. Compliance with recognized standards.
3. Refer to other Sections for requirements for samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation and similar characteristics.
 - a. Samples erected at site and not incorporated into the Work, or designated as the Owner's property, are the Contractor's property and shall be removed from the site.

G. Architect's Action:

1. Except for submittals for the record or information, where action and return are required, the Architect will review each submittal, mark to indicate action taken, and return. Compliance with contract documents and specified characteristics is the Contractor's responsibility.
2. Action Stamp

- a. The Architect will stamp each submittal with an action stamp. The Architect will mark the stamp appropriately to indicate the action taken.
- b. Architect's Action Stamp will read as follows:
 - Reviewed by Lathan Associates Architects, P.C.
 - Date
 - Approved for Design as Noted Subject to Contractor Verifying Quantities and Dimensions

2.0 - PRODUCTS

Not applicable.

3.0 - EXECUTION

Not applicable.

END OF SECTION

ELECTRONIC SUBMITTAL REQUIREMENTS FOR
LATHAN ASSOCIATES ARCHITECTS, P.C.

1. Processing: General Contractor must review and approve shop drawings and submittals prior to submitting to Architect. Allow the Architect two (2) weeks for initial review. Allow more time if the Architect must delay processing to permit coordination with other engineers and consultants.

NOTE: No extension of Contract Time will be authorized because of failure to transmit submittals sufficiently in advance of the Work to permit processing.

2. Contractors Action / Approval
Include General Contractor's electronic certification stamp that information has been checked by the General Contractor and complies with requirements of the Contract Documents before submitting to architect. General Contractor's action stamp must include **Approved** or **Approved as Noted**.

Information received without the contractor's stamp will not be reviewed and no action will be taken by engineer or architect.

DIGITAL file name shall include Architect Job No, Specification Section number and description. (e.g., 15-01, 06100 - Rough Carpentry). We will not accept files that are randomly named. (e.g. scan 1234 or from Xerox Copier, etc.)

3. Submittal Preparation:
Include the following information on transmittal / email.
 - a. Date
 - b. Project Name and Architect's Project Number.
 - c. Name of the General Contractor and Contact within company.
 - e. Subcontractor/Supplier.

Clearly state **Number** and title of appropriate Specification Section and **Description** of Item and if applicable

- a. Name of the Manufacturer.
- b. Model / Style of Item.

4. **Electronic submittals will only be accepted when emailed to: submittals@lathanassociates.com**

DO NOT COPY ARCHITECTS OR ENGINEERS WITH THE SUBMITTAL

5. After receiving approved submittals, **General Contractor is responsible for printing and delivering 2 hard copies of the approved shop drawings to the Architect within 10 days.** Submittals are not considered complete until these copies are received by the Architect and may have a direct effect on Pay Requests and / or final payment.

I have read the above requirements and agree to the terms set forth in this document.

General Contractor

by: _____
Authorized Signature

Architect Job Name and Number

PRODUCT SUBSTITUTION PROCEDURES - SECTION 01360

1.0 GENERAL

- 1.1 Section Includes:
 - A. General requirements for product options and substitution procedures.
 - B. Material and product options.
 - C. Substitutions.
 - D. Coordination
 - E. Substitution Request Form.
- 1.2 Related Sections:
 - A. Section 01025 - Summary of Work
 - B. Section 01040 - Project Coordination
 - C. Section 01350 - Shop Drawing Submittals
 - D. Section 01400 - Materials and Equipment
 - E. Section 01900 - Warranties
 - F. Section 01910 - Close Out Procedures
 - G. In addition to "General Conditions of the Contract", comply with product option and substitution requirements specified in this Section.
- 1.3 Material and Product Options:
 - A. Materials and products specified by reference standards, by performance, or by description only:
 - 1. Any product meeting specified requirements.
 - B. Materials and products specified by naming products of one or more manufacturers with a provision for an equivalent product:
 - 1. Submit one of the products listed which complies with specified requirements or submit a Request for Substitution for a product of manufacturer not specifically named which complies with specified requirements.
 - C. Materials and products specified by naming products of several manufacturers meeting specifications:
 - 1. Submit one of the products listed which complies with specified requirements or submit a Request for Substitution for a product of manufacturer not specifically named which complies with specified requirements.
- 1.4 Substitutions:
 - A. After date of Notice to Proceed, Architect / Engineer will consider requests from Contractor for substitutions. Subsequently, substitutions will be considered only when a material or product becomes unavailable due to no fault of Contractor or as follows:
 - 1. Lockouts
 - 2. Strikes
 - 3. Bankruptcy
 - 4. Discontinuation of products
 - 5. Proven shortage
 - 6. Other similar occurrences
 - B. Each proposed substitution of materials or products for that one specified is a representation by Contractor that he has personally investigated the substitution and determined that the proposed substitution is equivalent or superior to that specified in quality, durability and serviceability, design, appearance, function, finish, performance, and of size and weight which will permit installation in spaces provided and allow adequate service access. Additionally, Contractor agrees that it

will provide and/or do the following:

1. Same warranty on substitution as for specified product or materials;
 2. Coordinate installation and make other changes that may be required for Work to be complete in all respects;
 3. Waive claims for additional costs which may subsequently become apparent;
 4. Verify that proposed materials and products comply with applicable building codes and governing regulations and, where applicable, has approval of governing authorities having jurisdiction.
- C. The Architect/Engineer will review requests from Contractor for substitutions with the Owner. Contractor shall not purchase or install substitute materials and products without written approval. The Architect/Engineer will give written notice to Contractor and the Owner of acceptance or rejection within a reasonable time.
- D. Document each request for substitution with complete data substantiating compliance of proposed substitution with Contract Documents. Contractor shall use the *Substitution Request Form* along with appropriate attachments and submit them to the office of the Architect. A copy of the *Substitution Request Form* is included at the end of this Section.
1. Documents, as appropriate, shall include the following:
 - a. Reason for the proposed substitution;
 - b. Change in Contract Sum and Contract Time, if any;
 - c. Effect on work progress schedule and completion date;
 - d. Changes in details and construction of related work required due to substitution
 - e. Drawings and samples
 - f. Product identification and description
 - g. Performance and test data
 - h. Itemized comparison of the qualities of the proposed substitution to the product specified including durability, serviceability, design, appearance, function, finish, performance, size and space limitations, vibration, noise, and weight
 - i. Availability of maintenance service, source and interchangeability of parts or components
 - j. Additional information as requested.
- E. In the event of credit change in the cost, the Owner shall receive all benefit of the reduction in cost of the proposed substitution. Credit shall be established prior to final approval of the proposed substitution and will be adjusted by Change Order.
- F. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals without separate written request, without having been reviewed and approved by Contractor, or when acceptance will require substantial revision of Contract Documents without addition compensation to the Architect / Engineer.
- G. In the event that the Contractor or Subcontractor has neglected to place an order for specified materials and products to meet the work progress schedule, specified requirements, color schemes or other similar provisions, such failure or neglect shall not be considered as legitimate grounds for an extension of completion time nor shall arbitrary substitutions be considered to meet completion date.
- H. Only one request for substitutions will be considered for each product. When substitutions are not accepted, the Contractor shall provide specified product.
- I. Should substitution be accepted, and substitution subsequently is defective or

otherwise unsatisfactory, Contractor shall replace defective material or product with specified material or product at no cost to Owner.

1.5 Coordination:

- A. When a specified, optional, specified by reference standard, or proposed substitution item of equipment or material is submitted which requires minor changes or additions to the designed structure, finishes or to mechanical and/or electrical services due to its requirements being different from those shown on the Contract Documents, itemize the changes required and attach to submittal. Do not proceed with changes without written approval from the Architect / Engineer.
- B. Contractor shall make adjustments and changes required to coordinate Work for installation of optional materials and products, approved substitutions and materials and products specified by reference standards without additional costs to Owner or Architect/ Engineer.

2.0 PRODUCTS
Not applicable.

3.0 EXECUTION
Not applicable.

END OF SECTION

PRIOR APPROVAL / SUBSTITUTION REQUEST FORM

Date: _____

Company Submitting Request: _____
(Name and Address)

Contact Name: _____ Phone: _____ Fax: _____

E-Mail: _____

PROJECT NAME: _____

SPECIFIED ITEM: _____
(Section) (Page) (Description)

The undersigned requests consideration of the following product substitution:

PROPOSED SUBSTITUTION: _____
Provide Product Name / Model /Manufacturer

- Attached data includes: _____ Product Description _____ Performance and Test Data
_____ Drawings _____ Specifications _____ Photographs
- _____ Yes / No changes will be required to the Contract Documents for the proper installation of proposed product substitution. If yes, then attach data that includes description of changes.

The undersigned states that the following paragraphs, unless modified by attachments, are correct:

- The proposed substitution does not affect dimensions shown on the drawings.
- No changes to the building design, engineering design, or detailing are required by the proposed substitution.
- The proposed substitution will have no adverse effect on other trades, the construction schedule, or **specified warranty requirements**.
- No maintenance is required by the proposed substitution other than that required for originally specified product.
- Other Information

The undersigned further states that they have read the corresponding specification section in the project manual and confirms that the function, appearance and quality of the proposed substitution are equivalent or superior to the originally specified product. _____ initial.

Signature: _____ Printed Name: _____

Fax Number: _____

For Architect's Use:

_____ Accepted	_____ Accepted As Noted	_____ Incomplete Information
_____ Not Accepted	_____ Received Too Late	_____ No Substitutions Accepted For This Product

Reviewed By / Date: _____

Processed by Addendum No. _____

Comments: _____

1.0 - GENERAL REQUIREMENTS

1.1 Products and Materials

A. Products, materials and manufactured items or articles of like nature shall, as nearly as possible, be of one brand or manufacturer. No changes or substitutions shall be made without written consent of the Architect. In selection of colors and patterns, the Architect reserves the right to select from the manufacturer's running pattern line (within same price range) of the materials called for in the Specifications without the added cost to the Owner.

B. All products and materials used for this project shall be asbestos free.

1.2 Trade Names

The use of manufacturer's names and serial numbers are given to establish a standard of manufacture and not intended to be restrictive or preferential. Similar, equal, and approved materials of other manufacturers will be acceptable, subject to the approval of the Architect, pursuant to requirements set forth in INSTRUCTIONS TO BIDDERS and as required by the Specifications.

1.3 Measurements

Before ordering any material or doing any work, the Contractor shall verify all measurements of the building and shall be responsible for correctness of same. No extra charge or compensation will be allowed because of differences between actual measurements and the dimensions indicated on the Drawings. Any differences which may be found, shall be submitted to the Architect for consideration before proceeding with the work.

1.4 Salvageable Material

Any salvageable material and/or equipment shall remain the property of the Owner and, upon removal from its existing location, shall be stored where directed by the Architect.

In the event that the Owner does not wish to keep the salvaged material, it shall be the responsibility of the Contractor to remove same promptly from the site.

Salvageable material shall include those items indicated on the drawings as items to be reused or relocated. Remove all finish hardware from doors noted to be removed under demolition. Tag and label finish hardware as to door function (and label), and turn over to Owner.

Coordinate with Architect on questionable salvage items.

1.5 Unused Materials

Unused excess materials purchased for this project and charged against the contract shall be the property of the General Contractor and removed upon final completion.

END OF SECTION

SECTION 01410 – QA/ QC, STRUCTURAL TESTS, AND STRUCTURAL SPECIAL INSPECTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements required for compliance with the International Building Code, Chapter 17, Structural Tests and Special Inspections as well as specific quality-assurance and -control requirements for individual construction activities as referenced in the Sections that specify those activities.
- B. Structural testing and special inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve contractor of responsibility for compliance with other construction document requirements.
 - 1. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the construction document requirements.
 - 2. Requirements for contractor to provide quality-assurance and quality-control services required by architect, owner, or authorities having jurisdiction are not limited by provisions of this section.
- C. The owner will engage one or more qualified special inspectors and / or testing agencies to conduct structural tests and special inspections specified in this section and related sections and as maybe specified in other divisions of these specifications.

1.3 DEFINITIONS

- A. Approved Agency: An established and recognized agency regularly engaged in conducting tests or furnishing inspection services, when such agency has been approved by the building official and the Structural Engineer of Record.
- B. Construction Documents: Written (including specifications), graphic and pictorial documents prepared or assembled for describing the design, location and physical characteristics of the elements of a project necessary for obtaining a building permit. Construction Documents include all supplemental instructions, sketches, addenda, and revisions to the drawings and specifications issued by the registered design professional beyond those issued for a building permit.
- C. Shop Drawings / Submittal Data: Written, graphic and pictorial documents prepared and / or assembled by the contractor based on the Construction Documents.
- D. Structural Observation: Visual observation of the structural system by a representative of the registered design professional's office for general conformance to the approved construction documents. Structural observations are not considered part of the structural tests and special inspections and do not replace inspections and testing by the testing agency or special inspector.

- E. Special Inspector: A qualified person who demonstrating competence, to the satisfaction of the code enforcement official and registered design professional in responsible charge, for inspection of the particular type of construction or operation requiring special inspection. The special inspector shall be a licensed professional engineer or engineering intern or a qualified representative from the testing agency.
- F. Special Inspection, Continuous: The full-time observation of work requiring special inspection by an approved special inspector who is present in the area where the work is being performed.
- G. Special Inspection, Periodic: The part-time or intermittent observation of work requiring special inspection by an approved special inspector who is present in the area where the work has been or is being performed and at the completion of the work.
- H. Testing Agency: A qualified materials testing laboratory under the responsible charge of a licensed professional engineer, approved by the code enforcement official and the registered design professional in responsible charge, to measure, examine, test, calibrate, or otherwise determine the characteristics or performance of construction materials and verify confirmation with construction documents.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications:
 - 1. Minimum qualifications of inspection and testing agencies and their personnel shall comply with ASTM E329-03 Standard Specification for Agencies in the Testing and / or Inspection of Materials Used in Construction.
 - a. Inspectors and individuals performing tests shall be certified for the work being performed as outlined in the appendix of the ASTM E329. Certification by organizations other than those listed must be submitted to the building official for consideration before proceeding with work.
 - 2. Additional minimum qualifications of inspection and testing agencies and their personnel inspecting and testing concrete and concrete related work shall be as follows:
 - a. An independent agency, acceptable to the Structural Engineer of Record qualified according to ASTM C 1077.
 - b. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
 - c. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.
 - 3. In addition to these requirements, local jurisdiction may have additional requirements. It is the responsibility of the testing and inspection agencies to meet local requirements and comply with local procedures.

1.5 CONFLICTING REQUIREMENTS, REPORTS, AND TEST RESULTS

- A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to the registered design professional in responsible charge for a decision before proceeding.

- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to the registered design profession in responsible charge for a decision before proceeding.
- C. The special inspector's reports and testing agencies results shall have precedence over reports and test results provided by the contractor.
- D. Where a conflict exists between the construction documents and approved shop drawings / submittal data, the construction documents shall govern unless the shop drawings / submittal data are more restrictive. All conflicts shall be brought to the attention of the registered design professional in responsible charge.

1.6 SUBMITTALS BY SPECIAL INSPECTOR AND / OR TESTING AGENCY

- A. Special inspectors shall keep and distribute records of inspections. The special inspector shall furnish inspection reports to the building official, and to the registered design professional in responsible charge, contractor, architect, and owner. Reports shall indicate that work inspected was done in conformance to approved construction documents. Discrepancies shall be brought to the immediate attention of the contractor for correction. If the discrepancies are not corrected, the discrepancies shall be brought to the attention of the building official and to the registered design professional in responsible charge prior to the completion of that phase of the work. A final report documenting required special inspections and correction of any discrepancies noted in the inspections shall be submitted at a point in time agreed upon by the permit applicant and the building official prior to the start of work.
 - 1. Special inspection reports and test results shall include, but not be limited to, the following:
 - a. Date of inspection.
 - b. Description of inspections or tests performed including location (reference grid lines, floors, elevations, etc.).
 - c. Statement noting that the work, material, and / or product conforms or does not conform to the construction document requirements.
 - 1) Name and signature of contractor's representative who was notified of work, material, and / or products that do not meet the construction document requirements.
 - d. Name and signature of special inspector and / or testing agency representative performing the work.
 - e. Additional information as required herein.
- B. Schedule of Non-Compliant Work: Each agent shall maintain a log of work that does not meet the requirements of the construction documents. Include reference to original inspection / test report and subsequent dates of re-inspection / retesting.
- C. Reports and tests shall be submitted within 1 week of inspection or test. Schedule of Non-Compliant Work shall be updated daily and submitted at monthly intervals.
- D. Concrete Test Reports: Test results shall be reported in writing to Architect, Engineer, concrete manufacturer, and Contractor within 24 hours of testing. Reports of compressive-strength tests shall contain:
 - 1. Project identification name and number.
 - 2. Date and time of concrete placement.

3. Mix design number or identification.
 4. Design compressive strength at 28 days.
 5. Design Air Content.
 6. Design Slump.
 7. Location of concrete batch in Work.
 8. Time concrete was batched.
 9. Amount of water withheld at plant.
 10. Amount of water added at site.
 11. Temperature of mix at point of placement.
 12. Slump at point of placement
 - a. When use of a Type I or II plasticizing admixture conforming to ASTM C 1017 or when a Type F or G high range water reducing admixture conforming to ASTM C494 is used, slump shall be measured and report both before addition of the admixture and at the point of placement.
 13. Air content.
 14. Name of concrete testing and inspecting agency.
 - a. Name of Laboratory Technician and ACI Certification Number.
 - b. Name of Field Technician and ACI Certification Number.
 15. Compressive breaking strength.
 16. Type of break.
- E. Final Report of Special Inspections. Submitted by each agent listed in the schedule of Structural Testing and Special Inspections.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION

3.1 CONTRACTOR'S RESPONSIBILITY

- A. The contractor shall coordinate the inspection and testing services with the progress of the work. The contractor shall provide sufficient notice to allow proper scheduling of all personnel. The contractor shall provide safe access for performing inspection and on site testing.
- B. The contractor shall submit schedules to the owner, registered design professionals and testing and inspecting agencies. Schedules will note milestones and durations of time for materials requiring structural tests and special inspections.
- C. The contractor shall repair and / or replace work that does not meet the requirements of the construction documents.
 - a. Contractor shall engage an engineer / architect to prepare repair and / or replacement procedures.
 - b. Engineer / architect shall be registered in the state in which the project is located. Engineer shall be acceptable to the registered design professional in responsible charge,

- code enforcement official, and owner.
- c. Procedures shall be submitted for review and acceptance by the registered design professional in responsible charge, code enforcement official, and owner before proceeding with corrective action.
- D. The contractor shall be responsible for costs of:
 - a. Re-testing and re-inspection of materials, work, and / or products that do not meet the requirements of the construction documents and shop drawings / submittal data.
 - b. Review of proposed repair and / or replacement procedures by the registered design professional in responsible charge and the inspectors and testing agencies.
 - c. Repair or replacement of work that does not meet the requirements of the construction documents.

3.2 STRUCTURAL OBSERVATIONS

- A. Structural observations may be made periodically as determined by the registered design professional in responsible charge.

3.3 TESTING AND INSPECTION

- A. Testing and inspection shall be in accordance with the attached Schedule of Special Inspections, as listed elsewhere in the project documents, and as listed herein.
- B. Inspection of Fabricator's QC procedures
 - 1. Review the quality control procedures of the following fabricators for completeness and adequacy relative to the fabricator's scope of work: steel fabricator AND metal truss fabricators.
 - i. Exception: AISC Certified Steel Fabricators that submit a "Certificate of Compliance" at completion of their scope of work.
- C. Soils, Periodic Inspection.
 - 1. Verify bearing capacities of soils beneath footings is in accordance with the approved project soils report and earthwork specifications.
 - 2. Verify assumed bearing capacities (As noted on the drawings, recommended by the geotechnical engineer, and specified in earthwork specifications.) and determine settlements of soils beneath footings and building pad.
 - 3. Verify site preparation prior to beginning fill placement. Verify fill material type, placement method, lift thickness, and compaction of fill material. Verify in-place density of compacted fill.
 - i. As recommended in approved soils report and specified in earthwork specifications.
- D. Concrete, Continuous Inspection
 - 1. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

- i. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd, but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
 - ii. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
- 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 mixture. 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 mixture.
- 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 mixture.
 - i. Unit Weight is only required for lightweight concrete
- 6. Compressive-Strength Tests: ASTM C 39; test one laboratory-cured specimens at 7 days, one set of two specimens at 28 days, and hold one in reserve for later testing as directed by the Structural Engineer of Record.
 - i. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
- 7. Inspect bolts to be installed prior to and during placement of concrete.
- 8. Inspect concrete placement to verify operations are in accordance with project requirements.
 - i. Verify correct mix is used.

E. Concrete, Periodic Inspection

- 1. Floor flatness:
 - i. Measure floor and slab flatness and levelness according to ASTM E 1155 within **24** hours of finishing..
- 2. Inspect concrete formwork prior to concrete placement, except as noted. Verify that construction joints are properly keyed. Verify that slab recesses, if any, have been installed.
- 3. Inspect reinforcing steel prior to concrete placement, except as noted, for installation including size, spacing and bar clearances. Verify that lap splices and embedment lengths are per the construction documents. Verify that dowels for work above are properly aligned and spaced to match other work.

4. Inspect all concrete curing operations and verify they are in accordance with project requirements.

F. Steel Construction, Periodic Inspection

1. Inspect high-strength bolts, nuts and washers:
 - i. Identify markings to conform to ASTM standards specified in the construction document.
 - ii. Inspect manufacturer's certificate of compliance.
2. Inspect high-strength bolting: Bearing-type connections.
3. Inspect and verify structural steel material:
 - i. Identification markings to conform to ASTM standards specified in the approved construction documents.
 - ii. Manufacturers' certified mill test reports.
4. Inspect and verify weld filler materials:
 - i. Identification markings to conform to AWS specification in the approved construction documents.
 - ii. Manufacturer's certificate of compliance required
5. Inspect welding: Structural Steel:
 - i. Single-pass fillet welds $\leq 5/16$
 - ii. Metal roof deck connections.

G. Special Inspection for Wind Resistance, Periodic Inspection

1. Roof Cladding and Roof Framing Connections.
2. Wall Connections to Roof.
3. Diaphragms connections to framing.

- H. Reference related specifications for the minimum level of inspections and testing. Provide additional inspections and testing as necessary to determine compliance with the construction drawings.

PART 4 - SCHEDULES AND FORMS (ATTACHED)

- 4.1 STATEMENT OF SPECIAL INSPECTIONS.
- 4.2 FABRICATOR'S CERTIFICATE OF COMPLIANCE
- 4.3 QUALITY ASSURANCE PLAN

4.4 CONTRACTOR'S STATEMENT OF RESPONSIBILITY

4.5 SCHEDULE OF SPECIAL INSPECTIONS.

4.6 FINAL REPORT OF SPECIAL INSPECTIONS.

END OF SECTION 01410

Statement of Special Inspections

Project: *Butler Building for Surplus Wallace Drive Campus Gadsden State Community College*

Location: *1001 George Wallace Drive, Gadsden, Alabama 35903*

Owner: *Wallace Drive Campus Gadsden State Community College*

Design Professional in Responsible Charge: *H. Craig Winn, P.E.*

This *Statement of Special Inspections* is submitted as a condition for permit issuance in accordance with the Special Inspection and Structural Testing requirements of the Building Code. It includes a schedule of Special Inspection services applicable to this project as well as the name of the Special Inspection Coordinator and the identity of other approved agencies to be retained for conducting these inspections and tests. This *Statement of Special Inspections* encompass the following disciplines:

☒ Structural ☐ Mechanical/Electrical/Plumbing
☐ Architectural ☐ Other: _____

The Special Inspection Coordinator shall keep records of all inspections and shall furnish inspection reports to the Building Official and the Registered Design Professional in Responsible Charge. Discovered discrepancies shall be brought to the immediate attention of the Contractor for correction. If such discrepancies are not corrected, the discrepancies shall be brought to the attention of the Building Official and the Registered Design Professional in Responsible Charge. The Special Inspection program does not relieve the Contractor of his or her responsibilities.

Interim reports shall be submitted to the Building Official and the Registered Design Professional in Responsible Charge.

A *Final Report of Special Inspections* documenting completion of all required Special Inspections, testing and correction of any discrepancies noted in the inspections shall be submitted prior to issuance of a Certificate of Use and Occupancy.

Job site safety and means and methods of construction are solely the responsibility of the Contractor.

Interim Report Frequency: *Weekly*

or ☐ per attached schedule.

Prepared by:

H. Craig Winn, P.E.

(type or print name)

H. Craig Winn, P.E.

Signature

2-13-2023

Date



Owner's Authorization:

Building Official's Acceptance:

Signature

Date

Signature

Date

Fabricator's Certificate of Compliance

Each approved fabricator that is exempt from Special Inspection of shop fabrication and implementation procedures per section 1704.2 of the International Building Code must submit a *Fabricator's Certificate of Compliance* at the completion of fabrication.

Project: *Butler Building for Surplus Wallace Drive Campus Gadsden State Community College*

Fabricator's Name:

Address:

Certification or Approval Agency:

Certification Number:

Date of Last Audit or Approval:

Description of structural members and assemblies that have been fabricated:

I hereby certify that items described above were fabricated in strict accordance with the approved construction documents.

Signature

Date

Title

Attach copies of fabricator's certification or building code evaluation service report and fabricator's quality control manual

QUALITY ASSURANCE PLAN

Quality Assurance for Seismic Resistance

Seismic Design Category

Quality Assurance Plan Required (Y/N)

Description of seismic force resisting system and designated seismic systems:

Quality Assurance for Wind Requirements

Basic Wind Speed (3 second gust)

Wind Exposure Category

Quality Assurance Plan Required (Y/N)

Description of wind force resisting system and designated wind resisting components:

Statement of Responsibility

Each contractor responsible for the construction or fabrication of a system or component designated above must submit a Statement of Responsibility.

Contractor's Statement of Responsibility

Each contractor responsible for the construction or fabrication of a system or component designated in the Quality Assurance Plan must submit a Statement of Responsibility.

Project: *Butler Building for Surplus Wallace Drive Campus Gadsden State Community College*

Contractor's Name:

Address:

License No.:

Description of designated building systems and components included in the Statement of Responsibility:

Contractor's Acknowledgment of Special Requirements

I hereby acknowledge that I have received, read, and understand the Quality Assurance Plan and Special Inspection program.

I hereby acknowledge that control will be exercised to obtain conformance with the construction documents approved by the Building Official.

Signature

Date

Contractor's Provisions for Quality Control

Procedures for exercising control within the contractor's organization, the method and frequency of reporting and the distribution of reports is attached to this Statement.

Identification and qualifications of the person(s) exercising such control and their position(s) in the organization are attached to this Statement.

Final Report of Special Inspections

Project: *Butler Building for Surplus Wallace Drive Campus Gadsden State Community College*

Location: *1001 George Wallace Drive, Gadsden, Alabama 35903*

Owner: *Wallace Drive Campus Gadsden State Community College*

Owner's Address:

Architect of Record:

Structural Engineer of Record:

To the best of my information, knowledge and belief, the Special Inspections required for this project, and itemized in the *Statement of Special Inspections* submitted for permit, have been performed and all discovered discrepancies have been reported and resolved other than the following:

Comments:

(Attach continuation sheets if required to complete the description of corrections.)

Interim reports submitted prior to this final report form a basis for and are to be considered an integral part of this final report.

Respectfully submitted,
Special Inspector

(Type or print name)

Signature

Date

Licensed Professional Seal

Agent's Final Report

Project: *Butler Building for Surplus Wallace Drive Campus Gadsden State Community College*

Agent:

Special Inspector:

To the best of my information, knowledge and belief, the Special Inspections or testing required for this project, and designated for this Agent in the *Statement of Special Inspections* submitted for permit, have been performed and all discovered discrepancies have been reported and resolved other than the following:

Comments:

(Attach continuation sheets if required to complete the description of corrections.)

Interim reports submitted prior to this final report form a basis for and are to be considered an integral part of this final report.

Respectfully submitted,
Agent of the Special Inspector

(Type or print name)

Signature

Date

*Licensed Professional Seal or
Certification*

1.0 - GENERAL

1.1 Related Documents

Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division - 1 Specifications Sections, apply to work of this Section. See drawings for additional Demolition and Protection Requirements not stated herein.

1.2 Description of Work

- A. Extent of selective demolition work as indicated on drawings and/or as required for completion of finish work.
- B. Types of Selective Demolition Work: Demolition requires the selective removal and subsequent offsite disposal of the following:
 - 1. It is the intent for all required existing building components, systems, related structure, materials, etc., be removed and/or relocated to allow for completion of new construction, whether indicated or not.
 - 2. All abandoned components, systems and related wiring, piping, ductwork, controls, fixtures, etc., shall be removed from job site, whether specifically indicated or not. Refer to Civil, Structural, Plumbing, Mechanical and Electrical drawings and specifications for respective demolition requirements and coordinate with Architectural.
 - 3. See drawings for other demolition items.

1.3 Submittals

- A. Submit schedule indicating proposed methods and sequence of operations for selective demolition work to Owner's representative for review prior to commencement of work. Include coordination for shut-off, capping, and continuation of utility services as required, together with details for dust and noise control protection.
- B. Provide detailed sequence of demolition and removal work to ensure uninterrupted progress of Owner's on-site operations.
- C. Existing building function and operation shall be maintained during construction unless scheduled and approved by the Owner. Work schedule shall vary as required to complete work as required.
- D. Existing facilities shall be maintained in operation during construction. Protect and/or relocate all utilities, service, security systems, satellite communications, data systems, etc., as required to ensure continuous operation and function. Temporary relocation and utility outages shall be scheduled and approved by the Owner.

1.4 Job Conditions

- A. Owner will be continuously occupying areas of the building immediately adjacent to areas of selective demolition. Conduct selective demolition work in manner that will minimize need for disruption of Owner's normal operations. Provide minimum of 72 hours advance notice to Owner of demolition activities which will severely impact Owner's normal operations.
- B. Owner and Architect assume no responsibility for actual condition of items or structures to be demolished.

- C. All salvageable materials, as selected by Owner, shall be removed, stored, and / or delivered to Owner as directed. Salvageable materials shall be protected during removal and delivery. All items of salvage not wanted by the Owner shall be the property of the General Contractor and removed from job site.
- D. Provide temporary barricades and other forms of protection as required to protect Owner's personnel and general public from injury due to selective demolition work.
 - 1. All paths to and from exits and entrances shall be maintained during construction. Provide temporary barricades, fences, warning signs, etc., as required, interior and exterior, to protect building occupants and pedestrians during construction and demolition.
 - 2. Erect temporary covered passageways as required by authorities having jurisdiction.
 - 3. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or element to be demolished, and adjacent facilities or work to remain.
 - 4. Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.
 - 5. Protect floors with suitable coverings when necessary.
 - 6. Construct temporary insulated solid dust proof partitions where required to separate areas where noisy or extensive dirt or dust operations are performed. Equip partitions with dustproof doors and security locks if required.
 - 7. Provide temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces, and installation of new construction to ensure that no water leakage or damage occurs to structure or interior areas of existing building.
 - 8. Remove protections at completion of work.
- E. Damages: Promptly repair damages caused to adjacent facilities by demolition work at no cost to Owner.
- F. Traffic:
 - 1. Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks and other adjacent occupied or used facilities.
 - 2. Do not close, block or otherwise obstruct streets, walks or other occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
- G. Explosives: Use of explosives will not be permitted.
- H. Utility Services:
 - 1. Maintain existing utilities indicated to remain, keep in service and protect against damage during demolition operations.
 - 2. Do not interrupt existing utilities or fire alarm/fire protection systems serving occupied or used facilities, except when authorized in writing by

authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities. Repair damages to such immediately.

- I. Environmental Controls:
 1. Use water sprinkling, temporary enclosures and other suitable methods to limit dust and dirt, interior and exterior, from rising and scattering in air to lowest practical level. **COMPLY WITH GOVERNING REGULATIONS PERTAINING TO ENVIRONMENTAL PROTECTION.**
 2. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding and pollution.

2.0 - PRODUCTS

Products are not applicable to this section.

3.0 - EXECUTION

3.1 Inspection

Prior to commencement of selective demolition work, inspect areas in which work will be performed. Photograph existing conditions of structure surfaces, equipment or of surrounding properties which could be misconstrued as damage resulting from selective demolition work; file with Owner's representative prior to starting work.

3.2 Preparation

- A. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement or collapse of structures to be demolished and adjacent facilities to remain.
- B. Cease operations and notify the Owner's representative immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.
- C. Cover, protect, and relocate furniture, equipment and fixtures to remain from soiling or damage when demolition work is performed in rooms or areas from which such items have not been removed.
- D. Erect and maintain dust-proof partitions and closures as required to prevent spread of dust or fumes to occupied portions of the building.
- E. Where selective demolition occurs immediately adjacent to occupied portions of the building, construct dust-proof partitions of minimum 4" studs, 5/8" drywall (joints taped) on occupied side, 1/2" fire-retardant plywood on demolition side, and fill partition cavity with sound-deadening insulation.
- F. Provide weatherproof closures for exterior openings resulting from demolition work.
- G. Locate, identify, stub off and disconnect utility services that are not indicated to remain.
- H. Provide by-pass connections as necessary to maintain continuity of service to occupied areas of building. Provide minimum of 72 hours advance notice to Owner if shut-down of service is necessary during change over.

3.3 Demolition

- A. Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on drawings in accordance with demolition schedule and governing regulations.

1. Demolish concrete and masonry in all sections. Cut concrete and masonry at junctures with construction to remain using power-driven masonry saw or hand tools; do not use power-driven impact tools.
 2. Locate demolition equipment throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors, roofs or framing.
 3. Provide services for effective air and water pollution controls as required by local authorities having jurisdiction.
 4. For interior slab on grade, use removal methods that will not crack or structurally disturb adjacent slabs or partitions. Use power saw where possible.
 5. Existing ceramic tile floor finishes shall be removed down to the top of the existing dropped slab.
- B. If unanticipated mechanical, electrical or structural elements which conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Architect in written, accurate detail. Pending receipt of directive from Architect, rearrange selective demolition schedule as necessary to continue overall job progress without delay.
- 3.4 Disposal of Demolished Materials
- A. Remove debris, rubbish and other materials resulting from demolition operations from building site. Transport and legally dispose of materials off site. Pay all related fees and costs.
 - B. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws and ordinances concerning removal, handling and protection against exposure or environmental pollution.
 - C. Burning of removed materials is not permitted on project site.
- 3.5 Clean-Up and Repair
- A. Upon completion of demolition work, remove tools, equipment and demolished materials from site. Remove protections and leave interior areas broom clean.
 - B. Repair demolition performed in excess of that required. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition work. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

END OF SECTION

1.0 - GENERAL

- 1.1 Scope
The work required under this Section consists of providing all labor, materials and equipment necessary to do all clean-up work; including, but not limited to, periodic cleaning, removal of temporary protection, removal of debris and final cleaning.
- 1.2 Related Sections
Administrative provisions and technical requirements specified under this Section are in addition to provisions for cleaning specified under various Sections of the Specifications and apply to each Section of Specifications.
- 1.3 Special Instructions
 - A. Contractor shall endeavor to keep interior free of dust and mud, take precautionary measures, and provide protective materials, such as insulated dust and noise partitions and gravel at all entries during dried-in stages of construction.
 - B. Upon completion of work in each area or part of the building and immediately prior to final inspection and acceptance of that respective area, that area shall be thoroughly cleaned and made ready for immediate occupancy by the Owner.
 - C. In case of failure to comply with the requirements of this Section for any part of the work within the time specified by the Architect, the Architect may cause the work to be done and deduct the price thereof from the Contract Price on the next succeeding monthly Application for Payment.

2.0 - PRODUCTS

- 2.1 Equipment
 - A. For periodic and final cleaning operations, use approved apparatus designed for the specific type of cleaning required and compatible with the particular materials to be cleaned.
 - B. Operate equipment in compliance with equipment manufacturer's instructions.
- 2.2 Materials
All soap, detergents, brushes, scrapers and other materials and accessories utilized in periodic and final cleaning shall be of a type recommended by the material manufacturer as being compatible with and non-injurious to the particular surface, material, equipment or finish to be cleaned.

3.0 - EXECUTION

- 3.1 Periodic Cleaning
 - A. The Contractor shall periodically, or as directed during the progress of the work, clean-up and remove from the premises all refuse, rubbish, scrap materials and debris caused by his employees, his Subcontractors or resulting from his work.
 - B. Such clean-up shall be sufficient to assure that at all times the premises are sanitary, safe, reasonably clean, orderly and workmanlike.
 - C. Remove oily rags and combustible waste, debris, rubbish and excess materials from the premises at the completion of each day's work, or more often, if required to keep the building and premises free from any accumulation of flammable and dangerous materials.

- D. At no time shall any rubbish, debris or any other material be thrown from window or door openings nor into foundation trenches.
- E. Clean areas prior to any painting work. Take care to settle and minimize dust before painting begins. Use commercial type vacuum cleaners.
- F. Close rooms and areas where painting and decorating work is completed to all but authorized personnel.
- G. All debris and waste materials shall become the property of the Contractor and shall be removed by him from the project site.
- H. Remove Debris from roof tops daily.
- I. Trim excess exposed dur-o-wall flush with face of CMU.
- J. Keep adjacent paved driveways and roads clear of mud and debris intruded as a result of this work.

3.2 Removal of Temporary Facilities

- A. Upon completion of work in each area or part of the building, remove temporary lighting, power, protection and enclosures and repair defects in materials and workmanship noted after removal of such.
- B. Before final completion and final acceptance, the Contractor shall remove from the Owner's property, and from all public and private property, all tools, scaffolding, falsework, temporary structures and/or utilities including the foundations thereof (except as the Owner permits in writing to remain).

3.3 Final Cleaning

- A. Before final completion and acceptance, the Contractor shall remove from the Owner's property, and from all public and private property, all refuse, rubbish, scrap and surplus material and debris caused by his employees, his Subcontractors, or resulting from his work, leaving the site clean and true to line and grade, and the work in a safe and clean condition, ready for use and operation.
- B. Clean all painted, enameled, stained or baked enamel work to remove all marks, stains, smudges, fingerprints and splatters from such surfaces.
- C. Clean and remove all stickers, labels, marks, stains, smudges and paint from all glass. Wash and polish all glass, including, but not limited to, that in mirrors, view windows and doors, on the interior and exterior. Scratched or marred glass shall be replaced.
- D. Clean all hardware and metals to remove all stains, marks, smudges, fingerprints, dirt, dust, paint or other disfigurement and polish. Scratched, marred or otherwise disfigured hardware or metals shall be replaced.
- E. Clean all tile and floor finishes of all kinds to remove all splatters, stains, paint, dirt and dust. Wash and apply a final coat of wax and polish all finished floors except concrete and carpet as recommended by the manufacturer or as required by the Architect.
- F. Clean all manufactured articles, fixtures, materials, appliances and equipment to

remove all stickers, labels, rust stains and temporary covers.

- G. Clean and condition all manufactured articles, fixtures, materials, appliances and equipment and all electrical, heating and air conditioning equipment as recommended or directed by the manufacturer.
- H. Blow out or flush out all foreign matter from all dust pockets, piping, tanks, pumps, fans, motors, devices, switches, panels, fixtures, boilers and similar features of all appliances and equipment and all electrical, heating and air conditioning equipment as recommended or directed by the manufacturer.
- I. Remove all paint from all identification plates on all appliances and equipment and all electrical, heating and air conditioning equipment and polish plates.
- J. Exterior walks, steps, ramps and platforms shall be washed down, and broom cleaned to remove all dirt, dust, stains or other disfigurements.
- K. Interior surfaces of all heating, ventilation and air conditioning ducts shall be damp or wet mopped or vacuum cleaned to remove all dirt and dust.
- L. In general, leave all work clean and free of dirt, dust, smudges, stains, paint spots, mastic, caulk, sealant and other excess materials.
- M. After final cleaning of building and prior to final balancing of heating and air conditioning system, all air filters shall be replaced with clean, new filters.
- N. Upon completion of final cleaning, remove all cleaning equipment, materials and debris from the building and the premises.

END OF SECTION

CHANGE ORDER PROCEDURES - SECTION 01800

1.0 - GENERAL

- A. This Section shall adhere to *General Conditions of the Contract and ACCS Form 2-F*, as issued by ACCS, a copy of which is included within this Specification Manual.
- B. Should changes in the work constitute an increase or decrease in the Contract amount, the General Contractor shall submit a Change Order Request (COR) which shall include a number for identification, description and cost break down.
- C. Contractor shall attach all supporting documentation, including, but not limited to the following:
 - 1. Breakdown of costs which shall include material, labor, delivery (freight), installation, taxes, and mark-up for overhead and profit.
 - 2. If a Subcontractor is used for the requested change, then supporting documentation listed for Item 1 shall also be provided by the Subcontractor and included with the COR.
- D. In accordance with *General Conditions of the Contract, Article 19*, the General Contractor shall note the following:
 - 1. Mark-Up Procedures for Change Order with net addition to Contract:
 - a. The General Contractor's mark-up for overhead and profit shall not exceed fifteen (15) percent.
 - b. Where Subcontract work is involved, the total mark-up for the Contractor and Subcontractor shall not exceed twenty-five (25) percent.
 - c. The Architect must be able to determine the total amount of mark-up, therefore, supporting documentation **must** state the mark-up of both the Subcontractor and the General Contractor.
 - 2. Mark-Up Procedures for Change Order with net Credit to Contract:
"General Conditions of the Contract":
Changes which involve a net credit to the Owner shall include credits for overhead and profit on the deducted work of no less than 5%.
 - 3. Overhead "Indirect Costs": For the purposes of determining an adjustment of the Contract Sum, "overhead" shall cover the Contractor's indirect costs of the change including but not limited to the following:
 - a. Bonds
 - b. Insurance
 - c. Superintendent
 - d. Job Office Personnel
 - e. Watchman
 - f. Job Office, office supplies and expenses
 - g. Temporary facilities and utilities
 - h. Home office expenses

3.0 - EXECUTION

- A. General Contractor shall submit COR to Architect for review and approval. If approved, the Architect will submit to Owner for final approval. Upon approval by the Owner, the Architect will prepare required number of copies of Change Order ACCS Form 2-5 and forward to General Contractor.
- B. One (1) copy of the Change Order is required and must be signed by the General

Contractor's Bonding Company with Power of Attorney attached.

- C. Sequence of execution shall be as follows:
1. General Contractor signs Change Order. Note: Change Order must be signed by an Officer within the company.
 2. General Contractor forwards Change Order to their Bonding Company.
 3. Bonding Company signs each copy and returns same to G. C.
 4. G. C. forwards Change Order to Architect.
 5. Architect forwards Change Order to local Board of Education.
 6. Owner executes and returns Change Order to Architect.
 7. Architect forwards Change Order to either the ACCS.
 8. All parties will receive a copy of fully executed Change Order for their permanent records.
- D. General Contractor may include cost of Change Order on Pay Application only after receipt of fully executed Change Order. This cost shall be included on Pay Application as a separate line item listing change order number and amount. Billing shall be for the percentage of work completed for the change order within the month covered by that Pay Application.
- E. All change(s) in the work shall require approval by the Owner, through the Architect, in advance of the commencement of any work associated with the change(s).
- F. Charges against Allowances shall **not** include General Contractor's mark-up.
- Refer to Specification Section 01020 - Allowances -
- G. Refer to "General Conditions of the Contract" - "ACCS Form 2-B for additional information.

END OF SECTION

1.0 - GENERAL

- A. Standard product warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
- B. Special warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.
 - 1. Refer to the General Conditions for terms of the Contractor's period for correction of the Work.
- C. Warranties
 - 1. Subcontractors: General Contractor shall provide a one-year warranty from each Subcontractor they have under contract for the project.
 - 2. Vendors/Suppliers: General Contractor shall obtain a one-year warranty from each Vendor/Supplier for manufactured product used for the project. Example: *XYs Building Products, Inc.* shall provide a one-year warranty for each product they provided for the project, such as, *toilet partitions and hollow metal doors and frames*. This warranty may be on a form or letterhead provided by the Vendor/Supplier and must list all products provided for the project.
 - 3. Manufacturers: The Manufacturer's warranty for each product shall be placed directly behind the applicable Subcontractor or Vendor/Supplier's warranty within the warranty binder.
 - 4. Roof Warranties: The executed roofing warranties shall be presented at Final Inspection. Manufacturer's warranties cannot be prorated.
- D. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's and limitations on product warranties do not relieve suppliers, manufacturer's and subcontractors required to countersign special warranties with the Contractor.
- E. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.
- F. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- G. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefitted from use of the Work through a portion of its anticipated useful service life.
- H. Owner's Recourse: Expressed warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise

available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.

1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 2. Where the Contract Documents require a special warranty, or similar commitment, the Owner reserves the right to refuse to accept the Work, until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.
- I. Submit written warranties to the Architect prior to the date certified for Substantial Completion. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion, submit written warranties upon request of the Architect.
1. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Architect within 15 days of completion of that designated portion of the Work.
- J. When the Contract Documents require the Contractor, or the Contractor and a subcontractor, supplier or manufacturer to execute a special warranty, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner, through the Architect, for approval prior to final execution.
1. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.
- K. Bind warranties and bonds in heavy-duty, commercial-quality, durable 3-ring, vinyl-covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (115-by-280-mm) paper. Three (3) sets of warranties and close out documents are required: one set will be retained by the Architect and two sets will be delivered to the Owner.
1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address, and telephone number of the Installer.
 2. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project title or name, and name of the Contractor.
 3. When warranted construction requires operation and maintenance manuals, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

2.0 - PRODUCTS (Not Applicable)

3.0 - EXECUTION

The One-Year Warranty issued by the General Contractor shall list all disciplines they are covering when there is not a warranty from a Subcontractor. For instance, some General Contractors have Masons employed within their company and, therefore, do not contract Masonry work through a Masonry Subcontractor. In that case, the General Contractor's warranty would list Masonry as part of their itemized list of warranted work. Other typical examples are Painting, Rough Carpentry,

Miscellaneous Metals, etc.

Warranties shall bear the same date as the Date of Substantial Completion. All warranties shall be effective for a period of One Year from Date of Substantial Completion with exceptions for special warranties requiring extended periods of warranty coverage.

This list is designed as an aid to comply with close-out procedures; however, it should not be considered a complete and comprehensive list. General Contractor should review warranty requirements specified in Project Manual.

Warranties shall include, but not be limited, to the following:

Warranties from ALL Subcontractors for this project.

DIVISION 2 - SITE WORK

Site Protection
Soil Poisoning
Earthwork
Lawns and Planting
Storm Drainage
Site Concrete Walks, Curbs & Paving
Fences and Gates

DIVISION 3 - CONCRETE

Cast-in-Place Concrete

DIVISION 5 -METALS

Structural Steel
Miscellaneous Metals

DIVISION 6 - CARPENTRY

Rough Carpentry

DIVISION 7 - MOISTURE PROTECTION

Pre-Engineered Metal Building Insulation
Sheet Metal Work Flashing and Trim
Caulking and Sealants

NOTE: Provide roofing warranties as stipulated in Division 7 of the specifications, and as required by The State of Alabama Department of Construction Management. Roofing warranties shall be presented at the time of Final Inspection.

DIVISION 8 - WINDOWS AND DOORS

Hollow Metal Doors and Frames
Rolling Section Overhead Door
Finish Hardware

DIVISION 9 - FINISHES

Paint

DIVISION 10 - SPECIALTIES

Identifying Devices
Roof Identification Plaque

DIVISION 12 - FURNITURE AND FIXTURES

DIVISION 13 – SPECIAL CONSTRUCTION
Pre-Engineered Steel Building

DIVISION 15 - MECHANICAL – HVAC
Mechanical Systems – Equipment – Labor

DIVISION 16 - ELECTRICAL
Electrical Systems – Fixtures -Equipment – Material and Labor

See attached WARRANTY FORMS immediately following for General Contractors and Subcontractors.

GENERAL CONTRACTOR WARRANTY FORM

G. C.' S PROJECT NO. _____ **ARCHITECT'S PROJECT NO:** _____

PROJECT NAME: _____

GENERAL CONTRACTOR: _____

(Name and Address)

PROJECT OWNER: _____

ARCHITECT: Lathan Associates Architects, P.C., 300 Chase Park South, Suite 200, Hoover, AL 35244

PROJECT SUBSTANTIAL COMPLETION DATE:

This is to certify that we, _____, the General Contractor for the above referenced project, per contract documents, warrant all labor, material and equipment provided and performed for a period of One (1) Year from the Date of Substantial Completion indicated above.

If applicable, we warrant additional work, materials and equipment for One (1) Year on the following:

By: _____
(Name and Title)

Dated this _____ **day of** _____

State of Alabama
County of _____

Sworn to and subscribed before me this

_____ day of _____

Notary Public

My Commission Expires: _____

SUBCONTRACTOR WARRANTY FORM

G. C.' S PROJECT NO. _____ ARCHITECT'S PROJECT NO: _____

PROJECT NAME: _____

GENERAL CONTRACTOR: _____

SUBCONTRACTOR: _____

(Name and Address) _____

PROJECT OWNER: _____

ARCHITECT: Lathan Associates Architects, P.C., 300 Chase Park South, Suite 200, Hoover, AL 35244

PROJECT SUBSTANTIAL COMPLETION DATE:

We, _____, Subcontractor for _____,
(name) (work)

as described in Specification Section(s) _____, do hereby warrant that all labor and materials provided and performed in conjunction with above referenced project are in accordance with the Contract Documents and will be free from defects due to defective materials and/or workmanship for a period of One (1) year from the Date of Substantial Completion indicated above or as required by the Specification Section relevant to your trade.

Should any defect develop during the warranty period due to improper materials and/or workmanship, the same, including adjacent work displaced, shall be made good by the undersigned at no expense to the Owner.

The Owner will give Subcontractor written notice of defective work. Should Subcontractor fail to correct defective work within Thirty (30) days after receiving notice, the Owner may, at his option, correct defects and charge Subcontractor cost for such correction. Subcontractor agrees to pay such charges upon demand.

Warranty applies to the following Work: _____

By: _____
(Name and Title)

Dated this _____ day of _____

1.0 - GENERAL

- A. Closeout requirements for specific construction activities are included in the appropriate Sections in Division 2 through 16.
- B. Final Inspection Procedures: See Section 01030 - Special Project Requirements for Inspection Requirements
 - 1. Deliver tools, spare parts, extra stock, and similar items.
 - 2. Changeover locks and transmit keys to the Owner.
 - 3. Complete startup testing of systems and instruction of operation and maintenance personnel. **Obtain signature(s) of all Owner's personnel participating in operation and maintenance instructions.**
 - 4. Remove temporary facilities, mockups, construction tools, and similar elements.
 - 5. Complete final cleanup requirements, including touchup painting.
 - 6. Touch up and repair and restore marred, exposed finishes.
- C. After Substantial Completion has been achieved, the General Contractor shall:
 - 1. Submit final payment request with releases and supporting documentation. Include insurance certificates where required.
 - a. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the Work claimed as substantially complete. Include supporting documentation for completion and an accounting of changes to the Contract Sum.
 - b. Advise the Owner of pending insurance changeover requirements.
 - c. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.
 - d. Submit record drawings, maintenance manuals, final project photographs, damage or settlement surveys, property surveys, and similar final record information.
 - e. Deliver tools, spare parts, extra stock, and similar items.
 - f. Changeover locks and transmit keys to the Owner.
 - g. Complete startup testing of systems and instruction of operation and maintenance personnel. Obtain signature(s) of all Owner's personnel participating in operation and maintenance instructions.
 - 2. Submit a copy of the final inspection list stating that each item has been completed or otherwise resolved for acceptance.
 - 3. Submit final meter readings for utilities, a record of stored fuel, and similar data as of the date of Substantial Completion.
 - 4. Submit Consent of Surety to final payment.
 - 5. Submit Release of Liens.
 - 6. Submit a final settlement statement.
 - 7. Submit evidence of continuing insurance coverage complying with insurance requirements.
- D. Record Drawings: Maintain a set of prints of Contract Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark the drawing most capable of showing conditions fully and accurately. Give attention to concealed elements.
 - 1. Mark sets with red pencil.
 - 2. Mark completed record drawings: "As-Built" Set.
 - 3. Upon completion of the Work, submit record drawings to the Architect for the Owner's records in the form of two (2) CD's.

- E. Record Specifications: Maintain one copy of the Project Manual, including addenda. Mark to show variations in Work performed in comparison with the text of the Specifications and modifications. Give attention to substitutions and selection of options and information on concealed construction. Note related record drawing information and Product Data. Mark cover of set: "As-Built".

Upon completion of the Work, submit record Specifications to the Architect for the Owner's records in the form of two (2) CD's.

Note: If space allows, both "As-Built" plans and specs may be scanned and saved onto a single CD and 2 copies of record CD's shall be submitted.

- F. Maintenance Manuals: Organize operation and maintenance data into sets of manageable size. Bind in individual, heavy-duty, 3-ring binders, with pocket folders for folded sheet information. Mark identification on front and spine of each binder. Include the following information:

1. Emergency instructions.
2. Spare parts list.
3. Copies of warranties.
4. Wiring diagrams.

- G. Close-Out Documents

Close-Out Documents consists of the following:

1. General Contractor's Warranty
2. Subcontractors' Warranties
3. Manufacturers' Warranties
4. Affidavit of Advertisement of Completion
5. Consent of Surety to Final Payment
6. Contractor's Affidavit of Release of Liens
7. Operating and Maintenance Manuals / Instructions to Owner
8. "As-Built" Plans and Specification Manual
9. Owner's Set of Shop Drawing Submittals

General Contractor shall submit three (3) sets of binders for Items 1-7. Documents should be bound in 3-ring binders in size suitable for amount of material included. Divider tabs should be used to separate items.

If Operating Manuals are large, they can be bound in separate binders as indicated under Paragraph I listed above.

"As-Built" Plans and Specification Manual (2 set of each) should be complete and submitted on CD's. All plans should be submitted as one set. Do not submit separate sets of "As-Built" plans for Plumbing, HVAC, Electrical, etc.

Architect shall submit one copy of the Shop Drawings to the Owner with close-out documentation.

2.0 - PRODUCTS (Not Applicable)

3.0 - EXECUTION

- A. Operation and Maintenance Instructions:

Arrange for each Installer of equipment that requires maintenance to provide instruction in proper operation and maintenance. Include a detailed review of the following items.

1. Maintenance manuals.
2. Spare parts, tools, and materials.

3. Lubricants and fuels.
 4. Identification systems.
 5. Control sequences.
 6. Hazards.
 7. Warranties and bonds.
 8. Maintenance agreements and similar.
- B. As part of instruction for operating equipment, demonstrate the following:
1. Startup and shutdown.
 2. Emergency operations and safety procedures.
 3. Noise and vibration adjustments.
- C. Final Cleaning: Employ experienced cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Complete the following operations before requesting inspection for certification of Substantial Completion.
1. Remove labels that are not permanent labels.
 2. Clean transparent materials, including mirrors and glass. Remove glazing compounds. Replace chipped or broken glass.
 3. Clean exposed finishes to a dust-free condition, free of stains, films, and foreign substances. Leave concrete floors broom clean. Vacuum carpeted surfaces.
 4. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication. Clean plumbing fixtures. Clean light fixtures and lamps.
 5. Clean the site of rubbish, litter, and foreign deposits. Rake grounds to a smooth, even textured surface.
- D. Pest Control: Engage a licensed exterminator to make a final inspection and rid the Project of rodents, insects, and other pests.
- E. Removal of Protection: Remove temporary protection and facilities.
- F. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Remove waste materials and dispose of lawfully.

END OF SECTION

1.0 - GENERAL

1.1 RELATED DOCUMENTS

- A. The General Provisions of the contract including General and Supplementary Conditions and General Requirements apply to the work specified in this section.

1.2 DESCRIPTION

- A. This Work of this Section includes the protection and preservation from injury or defacement of all vegetation and objects designated to remain and the prevention of silts and increased run off leaving the site during or after site development.
- B. The Contractor is solely responsible for controlling runoff and siltation from the site and onto protected or undisturbed areas of the site or adjacent sites. Means and methods described herein are the minimum acceptable.
- C. The Work of this Section is incidental to the Contract and will not be paid for separately except where unit prices may be in effect.
- D. Related Sections: Divisions 2 Earthwork.

1.3 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. General:
 - a. Listings: Issues listed by references, including revisions of issuing authority, from part of this specification to extent indicated. Issues listed are identified by number, edition, date, title, or other designation established by issuing authority. Issues subsequently referred to are referred to by an issuing authority abbreviation and a basic designation.
 - b. Modification: Modifications (by Architect) to reference standards, if any, are noted with standard.
 - 2. Alabama Dept. of Transportation (ALDOT), Standard Specifications for Highway Construction, latest Edition: Section 665. Hay bales and Silt Fencing: Section 871, Fencing material.
 - 3. Alabama Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and Urban Areas, latest Edition.
 - 4. Local Codes, Ordinances, Regulations.
- B. Pre-Construction Meeting: Before proceeding with site operations, review site features to remain and be protected at the site with Owner and Architects.
- C. Tree Damage:
 - 1. If any trees to be saved are severely injured so as to cause a loss of natural character to the crown, or so as to impair the life support system

or to cause death as a result of construction operation, the Contractor agrees to pay fifty dollars (\$50.00) per one inch (1") of caliper, measured four feet (4') above the ground, for trees one inch (1") in caliper and larger, as fixed and liquidated damages, as determined by the Architects..

2. Severely damaged trees requiring liquidated damages will be determined by the Architects.
3. Damaged trees which are repairable as determined by the Architect shall be repaired by a qualified tree surgeon, approved by the Architect, and whose services will be at the Contractor's expense.
4. Clean up and repair damages to Owner's satisfaction.

D. Site Damage:

1. If any protection materials or measures are dismantled, removed or altered, even temporarily, or if areas of the site designated to remain are utilized in any manner without the Architects written authorization, the Contractor agrees to pay the Owner Five Hundred Dollars (\$500.00) per infraction, as determined by the Architect, as fixed and liquidated damages.

2.0 - PERFORMANCE REQUIREMENTS

2.1 PRODUCT/MATERIAL DESCRIPTION

A. Wattles and Silt Fencing:

1. In accordance with ALDOT Section 665.
2. Install at perimeter of clearing and grading operations where shown on Drawings, (or as directed) as part of temporary erosion control and site protection.

3.0 - EXECUTION

3.1 JOB CONDITION

- A. It is intended that the part of the property on which new construction does not occur remain undisturbed and as is.
- B. Confine storage of materials, temporary facilities, and staging to areas approved by the Architect.
- C. Do not carry on construction operations or materials storage within five feet (5') of tree protection fencing or flagging for Limit of Clearing.

3.2 SEDIMENTATION AND EROSION CONTROL

- A. General: Employ erosion control management practices as required by the General Permit for Storm Water Discharges. The Contractor shall be responsible for obtaining any required erosion control permits for construction activity. The Contractor will be responsible for application and maintenance of all conditions required by the Permit. The Contractor will also be responsible for all permit fees. The Contractor shall be responsible for all requirements of the Permit until acceptance of all work under this Contract. The Owner will work with a third party firm for the required monitoring.

- B. Control and abate water pollution and erosion at its potential source; employ downstream sediment entrapment measures as a backup to primary control at the source.
- C. Take all reasonable precautions to prevent and suppress fires and other detrimental occurrences which may be caused by construction operations.
- D. Protect streams, lakes and reservoirs and drainage systems from contamination by siltation or other harmful materials.
- E. The Contractor, his employees and subcontractors shall use conservation practices during the work, which shall include but are not limited to, the following:
 - 1. Comply with all federal, state and local laws, rules and regulations for prevention and suppressive action for forest fires.
 - 2. Protect and preserve soil and vegetation cover on the property and on adjacent lands. Any disturbance of soil and vegetation cover outside the Limit of Clearing line will not be permitted under any condition.
 - 3. Prevent and control soil erosion and gulleying within the property covered by Contract and the lands immediately adjacent thereto as a result of construction.
 - 4. Plan and conduct construction operations in such a manner so as to prevent pollution of streams, lakes and reservoirs with sediment or other harmful material used in the construction of the project. Protect downstream properties.
 - 5. Do not deposit waste, loose soil or other materials in live streams, swales or drainage ways.
 - 6. Do not allow fuels, oils, bitumen or other greasy or chemical substances originating from construction operations to enter or be placed where they may enter a live stream or drainageway.
 - 7. Coordinate sedimentation and erosion control measures with the clearing and grubbing operation so that both activities occur in the correct relation to one another.
 - 8. Install and maintain sedimentation and erosion control measures as a continuing program until the site work is complete. This includes, but is not limited to, repairs, any damage from storms, regular maintenance, and removal and disposal of accumulated silt.
- F. Wattles shall be anchored by use of stakes.
- G. Once installed, maintain silt fence until its capacity has been reached or erosion activity in the areas has been stabilized. When a silt fence has reached its capacity to function and need for a backup fence becomes evident, provide an additional line of silt fence. Repair of a damaged silt fence shall be accomplished by utilizing same type of materials used in original construction.
- H. Install and maintain sedimentation and erosion control measures as a continuing program until the site work is complete. This includes repairs, damage from storms, regular maintenance and removal and disposal of accumulated silt.

3.4 MAINTENANCE

- A. Maintain erosion control features that have been installed. Maintenance of erosion control features will be considered as an incidental part of the work and no specific payment for this will be made.

END OF SECTION 02125

1.0 - GENERAL

1.1 Scope

The work included under this section consists of furnishing all labor, material and equipment necessary to chemically treat the soil for termite control.

1.2 Applicator

The chemical shall be applied by an approved Pest Control Operator, bonded and licensed in the state in which the work is performed.

1.3 Guarantee

Upon completion of the soil treatment and as a condition for its final acceptance, the Pest Control Operator shall furnish to the Owner a written guarantee providing:

- A. The Pest Control Operator will furnish the Owner with a Repair and Retreatment policy which has annual inspections included within the cost of policy at no additional cost to the Owner as outlined in Items B-E below.
- B. That the chemical having at least the required concentration and the rate and method of application complies in every respect with the standards contained herein.
- C. That the Pest Control Operator guarantees the effectiveness of the soil treatment against termite infestation for a period of not less than five (5) years from date of treatment.
- D. Pest Control Operator will re-inspect at least once annually during protection period. Cost of Guarantee will include annual inspections for a period of five (5) years at no additional cost to Owner.
- E. Evidence of re-infestation within the five (5) year guarantee period will be retreated without cost to the Owner. Any damage caused by termite infestation during the five (5) year guarantee period will be repaired or replaced by the Pest Control Operator at no additional cost to the Owner.

2.0 - PRODUCTS

Provide chemicals in accordance with current laws and regulations. Notify Architect of any discrepancies.

2.1 Chemicals

BASF - Termidor (Fipronil)
Taurus SC - Control Solutions (Fipronil)
Bayer Environmental Science - Premise

2.2 Mixing of Chemicals

Shall be observed on site by the Contractor's Superintendent.

3.0 - EXECUTION

3.1 Application

- A. Slab-On Ground Construction (Minimum application)

1. Apply an over-all treatment under entire surface of floor slab including terraces and entrance platforms. Apply at rate of 1 gallon per 10 square feet, except that if fill under slab is gravel or other absorbent material, apply at rate of 1-1/2 gallons per 10 square feet.
2. Apply to critical areas along both sides of foundation wall expansion joints, around plumbing, utility services and other features that penetrate the slab at rate of 1 gallon per 2-1/2 lineal feet per foot of depth.
3. Voids of unit masonry foundation walls. Apply to voids at rate of 1 gallon per 5 lineal feet.

END OF SECTION

1.0 - 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 grading (excavating and filling) as indicated on drawings to required lines, dimensions, contours, and elevations for proposed improvements, and the following:
 - 1. Removal of existing improvements in conflict with proposed improvements.
 - 2. Stripping and stockpiling of topsoil. Remove any excess topsoil from the site upon final stabilization.
 - 3. Scarifying, moisture conditioning, compaction, and testing of previously graded areas to ensure proper preparation and acceptance.
 - 4. Excavation and embankment placement to required lines, grades, and elevations.
 - 5. Importing of off-site borrow material suitable for structural fill as well as exporting any excess material.
 - 6. Remove materials from grading operations that are determined unsuitable by the Geotechnical Engineer from site and dispose of off-site.
 - 7. Preparation of areas to receive fill and preparation of excavation areas.
 - 8. Undercutting and replacing soft, unsuitable material like "fat" clays, old fill, organic materials, etc. with compacted engineer fill obtained from an off-site source meeting the project specifications.
 - 9. Preparing subgrades for slabs-on-grade, walks, pavements, lawns, and plantings.
 - 10. Excavating and backfilling trenches for buried utilities and pits for buried utility structures.
- B. Related Sections include the following:
 - 1. Division 1 Section "Unit Prices" for a schedule of unit prices.
 - 2. Division 1 Section "Construction Facilities and Temporary Controls."
 - 3. Division 2 Section "Excavation Support and Protection."

1.3 UNIT PRICES

- A. All excavation to be unclassified.
- B. However, all stabilization and undercut & replacement will be handled with a quantity allowance with unit price being provided on the bid proposal form to be included in the base bid. The bid proposal form will have unit prices for the undercutting of unsuitable soils and replacing with compacted structural fill. The quantity allowance breakdown is as follows:

Unsuitable soils and replacing with compacted structural fill: 200 CY

The unit price for "undercutting" shall include all cost associated with removing unsuitable soil from below the established subgrade elevation, off-site disposal and replacing with off-site material conforming to the project specifications and compacted to project requirement. Unsuitable material refers to material that is not suitable for building or pavement support for reasons associated with material properties, such as highly plastic soils, "fat" clays, and old fill. Material, which is otherwise suitable, but above the optimum moisture and requires moisture conditioning prior to use as engineered fill shall not be considered as "unsuitable". Note the unit prices are being provided for the addition to and deletion from the contract base bid as required by changing field conditions during construction.

- C. The measurement process for unsuitable soil amounts shall be the initial responsibility of the contractor. The basis for measurement will be based on a before and after cross section survey of the area in question performed by a licensed surveyor. No truck counts will be allowed. Measurements will be verified by the Owner's on-site Geotechnical Engineer.

1.4 DEFINITIONS

- A. Backfill: Soil materials used to fill an excavation.
1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Base Course: Layer placed between the subbase course and asphalt paving.
- C. Bedding Course: Layer placed over the excavated subgrade in a trench before laying pipe.
- D. Borrow: Satisfactory soil imported from off-site for use as fill or backfill.
- E. Cut line: Elevations, lines, and final cut subgrades in cut over excavated areas.
- F. Drainage Course: Layer supporting slab-on-grade used to minimize capillary flow of pore water.
- G. Excavation: Removal of material encountered above subgrade elevations.
1. Additional Excavation: Excavation below subgrade elevations or "cut line" as directed by Architect. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
 2. Bulk Excavation: Excavations more than 10 feet in width and pits more than 30 feet in either length or width.
 3. Unauthorized Excavation: Excavation below subgrade elevations or "cut line" or beyond indicated dimensions without direction by Geotechnical engineer and Architect. Unauthorized excavation, as well as remedial work directed by Geotechnical Engineer and Architect, shall be without additional compensation.
- H. Fill: Soil materials used to raise existing grades.

- I. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- J. Subbase Course: Layer placed between the subgrade and base course for asphalt paving, or layer placed between the subgrade and a concrete pavement or walk.
- K. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
- L. Unsuitable material:
 - 1. Fills: Topsoil; Frozen materials; construction materials; clods of clay and stones larger than 4" (unless otherwise specified); organic material, including silts; and inorganic material including silts which are to wet to be stable, or other materials identified by the Geotechnical Engineer.
 - 2. Existing subgrade: Same materials as listed in paragraph 1 above that are not capable of direct support of slabs, pavement and similar items with the possible exception of improvement by compaction, proof rolling, or similar methods as directed and approved by the Geotechnical Engineer.
 - 3. Unsuitable materials identified by the geotechnical report and drawings shall be anticipated and included in the base bid. See 1.3B Unit Prices for additional information.
- M. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.5 SUBMITTALS

- A. Submit per conditions of contract and Division 1.
- B. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
 - 1. Classification according to ASTM D 2487 of each on-site or borrow soil material proposed for fill and backfill.
 - 2. Laboratory compaction curve according to ASTM D 698 for each on-site or borrow soil material proposed for fill and backfill.

1.6 QUALITY ASSURANCE

- A. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548. (To be employed by the owner).
- B. Pre excavation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

1.7 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Architect and/or the Engineer and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Architect not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Architect's written permission.
 - 3. Contact utility-locator service for area where Project is located before excavating.
 - 4. Existing utilities shown on the drawings are from a combination of field locations, and utility company records. It is the Contractor's responsibility to field verify existing utilities prior to excavation.
- B. Demolish and completely remove from site existing underground utilities indicated to be removed or implied to be removed by new construction and not noted to remain. Coordinate with utility companies to shut off services if lines are active.
- C. Demolish and completely remove from site any buried remnant construction such as slabs, walls and foundations.
- D. Contours and existing topography shown on the drawings are believed to be reasonably correct. It shall be the Contractors responsibility to determine any discrepancies which would affect his work, to make allowance for such discrepancies in the contract sum and notify the Architect in writing of such discrepancies and allowances made.

2.0 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Topsoil:
 - 1. Materials considered useful for topsoil by the Architect shall be stockpiled at his direction at locations shown on the Drawings or as directed in the field. Topsoil shall be kept free from sub-soil, clay lumps, brush, objectionable weeds, litter, stones larger than 2 inches in diameter, stumps, roots, and other materials that would interfere with planting and maintenance operations.
 - 2. All topsoil shall be stored on the site by Contractor in a location approved by the Architect. The Contractor shall use such topsoil for the purpose of fulfilling the topsoil requirements specified in this Contract. Protect stockpile by immediately compacting, dressing down and seeding with annual rye for temporary cover. Provide a silt fence around the base of topsoil pile, after completing storage, to control erosion.
 - 3. Use topsoil stockpiles on site as necessary to complete landscape work indicated on Drawings and in accordance with specifications for landscaping.

- C. Satisfactory Soils: ASTM D 2487 soil classification groups GW, GP, GM, GC, SC, SW, SP, SM, MH, ML, CH, and CL, or a combination of these group symbols; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter. Soils that exhibit a liquid limit less than 50 and a plasticity index of less than 30.
- D. Unsatisfactory Soils: ASTM D 2487 soil classification groups OL, OH, and PT, or a combination of these group symbols.
 - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- E. Backfill and Fill: Satisfactory soil materials.
- F. Subbase: At least 90 percent passing a 1-1/2 inch passing a No. 200 sieve.
- G. Base: ASTM D2940; with at least 95 percent passing a 1-1/2 inch sieve and not more than 8 percent passing a No. 200 sieve.
- H. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- I. Bedding: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
- J. Drainage Fill: Washed, narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2- inch sieve and 0 to 5 percent passing a No. 8 sieve.
- K. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No. 4 sieve.
- L. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 ACCESSORIES

- A. Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored as follows:
- B. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, minimum 6 inches wide and 4 mils thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:
 - 1. Red: Electric.

2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

3.0 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.
- C. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
 1. Erosion control is the responsibility of the Contractor. Items shown on the Drawings are considered the minimum acceptable; however, as site conditions change, additional measures may be required to control sediment.
 2. The Contractor shall indemnify and hold harmless the Owner, Architect, Engineer, Owner's representatives, and their agents and employees from any claim from their work.

3.2 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
 2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

3.3 EXPLOSIVES

- A. No explosives will be allowed.

3.4 EXCAVATION, GENERAL

- A. All excavation on this project is unclassified regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions.
- B. Material encountered in grading operation that, in the opinion of the Geotechnical Engineer or Owner, is unsuitable or undesirable shall be as follows:

1. The removal of unsuitable material will be directed by the Geotechnical Engineer or his field representative. All unsuitable material that is removed by the Contractor shall become the property of the Contractor and be disposed of off site or in a manner satisfactory to the Owner at no additional cost. All undercut shall be included in the Base Bid. See section 1.3 B. unit prices for quantity allowances.
 2. Back fill for these areas will be with material approved by the Geotechnical Engineer, with layers of acceptable material compacted to the requirements set forth in these specifications.
- C. Undercutting and replacement of unsuitable soils may be required to the underlying stiff soils. All undercut and replacement shall be handled in accordance with 1.3B Unit Prices above.

3.5 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 0.1 feet. Extend excavations a minimum of 10' in distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
- B. Where unsuitable soils are encountered, the soils shall be completely removed to underlying stiff material per 1.3B Unit Prices above.

3.6 EXCAVATION FOR WALKS AND PAVEMENT

- A. Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades, to a distance of 8' beyond the edge of these walks and pavements.
- B. Where unsuitable soils are encountered, the soils shall be completely removed to underlying stiff material per 1.3B Unit Prices above.

3.7 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
- B. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
1. Clearance: 12 inches on each side of pipe or conduit.
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous

support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

1. For pipe sizes 30" and below, the "cut line" shall be 4" below the bottom of the pipe and material replaced with 4" No. 57 stone bedding unless otherwise noted.
2. For pipe sizes larger than 30", the "cut line" shall be 6" below the bottom of the pipe and material replaced with 6" no. 57 stone bedding unless otherwise noted.

3.8 APPROVAL OF SUBGRADE

- A. Notify Architect when excavations have reached required subgrade.
- B. If Architect determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. Proof roll subgrade with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof roll wet or saturated subgrades.
- D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect.

3.9 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill may be used when approved by Architect.
 1. Fill unauthorized excavations under other construction or utility pipe as directed by Architect.

3.10 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow materials and satisfactory excavated soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.11 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 1. Construction below finish grade including, where applicable, damp-proofing, waterproofing, and perimeter insulation.
 2. Surveying locations of underground utilities for record documents.
 3. Inspecting and testing underground utilities.
 4. Removing concrete formwork.
 5. Removing trash and debris.
 6. Removing temporary shoring and bracing, and sheeting.

7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

3.12 UTILITY TRENCH BACKFILL

- A. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- B. Backfill trenches excavated under footings and within 18 inches of bottom of footings; fill with lean concrete to elevation of bottom of footings.
- C. Provide 4-inch-thick, concrete-base slab support for piping or conduit less than 30 inches below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase.
- D. Place and compact initial backfill of subbase material, free of particles larger than 1 inch, to a height of 12 inches over the utility pipe or conduit.
 1. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.
- E. Coordinate backfilling with utilities testing.
- F. Fill voids with approved backfill materials while shoring and bracing, and as sheeting is removed.
- G. Place and compact final backfill of satisfactory soil material to final subgrade.
- H. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.13 FILL

- A. Preparation: Remove vegetation, topsoil, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface before placing fills.
- B. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- C. Off-site borrow materials may be used as fill within the building and pavement areas provided that their plasticity index (PI) less than 30. Material shall have a minimum dry density of 100 pcf.
- D. High plasticity (fat clays) soils should not be used as engineered fill.
- E. Place and compact fill material in layers to required elevations as follows:
 1. Under grass and planted areas, use satisfactory soil material.
 2. Under walks and pavements, use satisfactory soil material.
 3. Under steps and ramps, use engineered fill.
 4. Under building slabs, use engineered fill.
 5. Under footings and foundations, use engineered fill.

3.14 MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air-dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.15 COMPACTION OF BACKFILLS AND FILLS

- A. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure. Fill to extend 5' outside of the proposed building footprint.
- C. Compact soil to not less than the following percentages of maximum dry unit weight according to ASTM D 698 (standard proctor).
 - 1. Under structures, building slabs, steps, and pavements, scarify and re-compact top 8 inches of existing subgrade and each layer of backfill or fill material at 98 percent.
 - 2. Under walkways, scarify and re-compact top 8 inches below subgrade and compact each layer of backfill or fill material at 98 percent.
 - 3. Under lawn or unpaved areas, scarify and re-compact top 8 inches below subgrade and compact each layer of backfill or fill material at 98 percent.

3.16 GRADING

- A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between adjacent existing grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Lawn or Unpaved Areas: Plus or minus 0.17 ft.
 - 2. Walks: Plus or minus 0.10 ft.
 - 3. Pavements: Plus or minus 0.10 ft.
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 0.08 ft. when tested with a 10-foot straightedge.

3.17 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- C. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
 - 1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 1000 sq. ft. or less of paved area or building slab, but in no case fewer than three tests.
 - 2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for each 100 feet or less of wall length, but no fewer than two tests.
 - 3. Trench Backfill: At each compacted initial and final backfill layer, at least one test for each 150 feet or less of trench length, but no fewer than two tests.
- D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.18 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
 - 1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.19 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 02300

1.0 - GENERAL

1.1 Scope

The work under this section consists of all finish grading, topsoil, lawns, seeding and sodding.

1.2 Extent of Lawn Area

A. The Lawn Area to receive top soil shall include the building site to the extent that will cover all unpaved areas disturbed by this construction. Blend new Lawn Area into areas of the site which are not covered under this Section.

B. Sod as indicated. Seed and straw all remaining areas disturbed by construction.

1.3 Time for Planting

When other portions of the work have progressed sufficiently the contractor may begin work for lawns and planting including the placing of topsoil. Operations shall be conducted under favorable weather conditions during the seasons which are normal for such work. Planting seasons generally shall be October 1 to March 1 for trees and plant materials, and April 1 to July 1 for planting permanent lawns.

1.4 Inspection for Acceptance

A. Inspection of the work of lawns and planting to determine the degree of completion of contract work, will be made by the architect at the conclusion of planting operations. Inspection of the work for final acceptance will be made at the end of the maintenance period.

B. After final inspection the Contractor will be notified of acceptance of all lawn and/or planting work, or if there are any deficiencies, of the requirements for completion of the work.

1.5 Guarantee and Replacement

The lawn shall be guaranteed for the duration of one full growing season after planting. The lawn shall be alive and in satisfactory growth at the end of the guarantee period.

2.0 - PRODUCTS

2.1 Materials

A. Fertilizer shall be 12-4-8 commercial fertilizer or equal and shall be uniform in composition, dry, and free-flowing. Fertilizer shall be delivered to the site in original unopened containers, each bearing the manufacturer's guaranteed analysis.

B. Lime shall be agricultural lime (Dolomite), or equal, containing not less than 85% of total carbonates, and shall be ground to such fineness that 50% will pass through a 100 mesh sieve and 90% will pass through a 20 mesh sieve.

C. Soil additive shall be 1/4" diameter or less pine bark mulch "Planting Mix".

D. Water used in this work shall be suitable for irrigation and free from ingredients harmful to plant life. Furnish hose and watering equipment as required.

2.2 Topsoil

Topsoil shall be a fertile, friable soil possessing physical and chemical characteristics typical of productive soils in the vicinity. Topsoil shall have an acidity range between pH 6.0 and pH 6.5 or shall be conditioned to fall within this range. Topsoil shall contain not less than 3%

organic matter as determined by loss on ignition of moisture-free samples dried at 100 degrees C. Topsoil shall be without admixture of subsoil and shall be clean and reasonably free from clay lumps, stones, stumps, roots or similar substances 2" or more in diameter, debris or other objects which might be a hindrance to planting operations or plant growth. A laboratory soils test to be provided by the contractor when requested.

2.3 Seed

- A. Seed for disturbed areas not indicated for sod shall be 100% hulled Bermuda or Fescue as per plans.
- B. Seed for temporary seeding shall be 100% Annual Rye Grass.
- C. At the contractor's option, areas to be seeded may be sprigged with approved Bermuda grass stolons at the rate of three (3) cubic yards per 1,000 sq. ft. of lawn. Spacing shall be maximum of 8" o.c. each way in rows.
- D. Seed shall meet the requirements of the Federal Seed Act. Seed mixtures shall be delivered in the original sealed packages bearing the producer's guaranteed analysis for percentages of mixture, purity germination, and weed seed content.

2.4 Sod

Sod shall be Tifton 419 Bermuda grass. Each piece of sod shall have a dense stand of the specified grass and shall be strongly rooted and free of pernicious weeds. It shall be mowed to a height not to exceed 3" before lifting and shall be of uniform thickness with not over 1-1/2" nor less than 1" of soil.

3.0 - EXECUTION

3.1 Preparation of Subgrade

The subsoil shall be graded uniformly and lightly compacted so that it will be parallel to proposed finish grade. Stones over 2" in size, sticks and rubbish shall be removed. No heavy objects except lawn rollers shall be moved over the lawn areas after the subgrade has been prepared.

3.2 Finished Grading

After the subgrade soil has been prepared, 4" of topsoil shall be spread evenly and lightly compacted. Topsoil other than that stockpiled shall be provided under this Section. No topsoil shall be spread in a frozen or muddy condition. Commercial fertilizer and lime shall then be scarified with a tiller into the top 3" of topsoil at the rate of 10 lbs. per 1000 sq. ft.

- A. Areas to be seeded shall be brought to finished grade and smoothed.
- B. Areas to be sodded shall be brought to within the thickness of the sod of finish grade.
- C. Areas where the topsoil has not been removed shall be scarified, smoothed, and sticks, stones and rubbish shall be removed.

3.3 Sowing of Seed

Immediately before any seed is to be sown, the ground shall be scarified as necessary and shall be raked until the surface is smooth, friable and of uniformly fine texture. Lawn areas shall be seeded evenly with a mechanical spreader at the rate of 5 lbs. of grass seed per 1000 sq. ft. of area, lightly raked and watered with a fine spray so as not to create runoff until thoroughly soaked. Fifty percent of the seed shall be sown in one direction, and the remainder at right angles to the first sowing. The method of seeding may be varied at the discretion of the contractor on his own responsibility to establish a smooth uniform turf.

3.4 Laying of Sod

Except as noted, the contractor shall lay sod in all lawn areas having a slope of 3 to 1 or steeper; a 6' diameter circle of sod around all lawn drain inlets; and where shown on the Drawings. Before any sod is laid, all soft spots and inequalities in grade shall be corrected. Sod shall be laid so that no voids occur and tamped or rolled. Topsoil shall be brushed or raked over the sodded area, rolled with 200# roller and the sod thoroughly watered.

- A. Sod on slopes 3 to 1 or steeper shall be held in place by wooden pegs driven through the sod into the soil until they are flush with the top of the sod.
- B. Strip or spot sod shall be placed so that the surface of the compacted sod will be slightly below the surrounding surface soil.

3.5 Temporary Seeding

Temporary seeding shall be promptly provided should the project be completed at a time when permanent grass cannot be planted. Seeding shall be seeded at the rate of 5 lbs. to 1000 sq. ft. of area. The contractor shall be responsible for erosional damage during the period of temporary planting. The specified fertilizer shall not be used for the Rye Grass planting. Prior to planting permanent lawn, the lawn bed shall be prepared as specified, and the Rye Grass growth shall be scarified in such a manner as to incorporate it into the soil. Should the temporary lawn be planted, it shall be maintained by occasional mowing and necessary repairs to all eroded areas until the beginning of the specified season for constructing permanent lawns.

3.6 Mulching of Seeded Areas

All seeded or sprigged areas having a slope of 4 to 1 or greater shall be mulched with a spray mulch of an approved latex-type material. Other areas may be mulched with wheat straw at the contractor's option. Spray mulch of a latex-type material shall be applied by hydroject method at the rate of 75 gals. of concentrate mixed in 1000 gals. of water per acre (23 gals. per 1000 sq. ft.).

3.7 Clean-Up

Any soil, mulch or similar material which has been brought onto paved areas by hauling operations or otherwise shall be removed promptly keeping these areas clean at all times. Upon completion of the planting, all excess soil, stones and debris which has not previously been cleaned up shall be removed from the site or disposed of as directed.

3.8 Lawn Maintenance

Lawn shall be protected and maintained by watering, mowing and replanting as necessary for at least 30 days after approximately 60% germination is evident.

END OF SECTION

1.0 - 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 storm drainage outside the building.

1.3 DEFINITIONS

- A. HDPE: High Density Polyethylene plastic.
- B. PVC: Polyvinyl chloride plastic.
- C. RCP: Reinforced concrete pipe.

1.4 PERFORMANCE REQUIREMENTS

- A. Gravity-Flow, Nonpressure-Piping Pressure Ratings: At least equal to system test pressure.

1.5 SUBMITTALS

- A. Shop Drawings: Include plans, elevations, details, and attachments for the following:
 - 1. Precast concrete manholes and other structures, including frames, covers, and grates.
 - 2. Cast-in-place concrete manholes and other structures, including frames, covers, and grates.
- B. Design Mix Reports and Calculations: For each class of cast-in-place concrete.
- C. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not store plastic structures, pipe, and fittings in direct sunlight.
- B. Protect pipe, pipe fittings, and seals from dirt and damage.
- C. Handle precast concrete manholes and other structures according to manufacturer's written rigging instructions.

1.7 PROJECT CONDITIONS

- A. Site Information: Perform site survey, research public utility records, and verify existing utility locations.
- B. Locate existing structures and piping to be closed and abandoned.

- C. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
1. Notify Architect not less than two days in advance of proposed utility interruptions.
 2. Do not proceed with utility interruptions without Architect's written permission.

2.0 - PRODUCTS

2.1 PIPING MATERIALS

- A. Refer to Part 3 "Piping Applications" Article for applications of pipe and fitting materials.

2.2 PIPES AND FITTINGS

- A. Corrugated PE Pipe and Fittings: AASHTO M 294, Type S, with smooth waterway for coupling joints.
1. Soil-tight Couplings: AASHTO M 294, corrugated, matching pipe and fittings to form soil-tight joints.
 2. Silt-tight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with pipe and fittings to form silt-tight joints.
- B. PVC Sewer Pipe and Fittings: According to the following:
1. PVC Sewer Pipe and Fittings, NPS 15 and Smaller: ASTM D 3034, SDR 35, for solvent-cemented or gasketed joints.
 - a. Gaskets: ASTM F 477, elastomeric seals.

2.3 MANHOLES

- A. Normal-Traffic Precast Concrete Manholes: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for rubber gasketed joints.
1. Diameter: 48 inches I.D. 5' depth, 60" I.D. > 5' depth, unless otherwise indicated.
 2. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
 3. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section and having separate base slab or base section with integral floor.
 4. Riser Sections: 4-inch minimum thickness, and lengths to provide depth indicated.
 5. Top Section: Concentric-cone type, unless eccentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
 6. Gaskets: ASTM C 443 rubber.
 7. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch-diameter frame and cover.

Final height adjustment can be made with courses of brick totaling no more than 16 inches.

8. Steps: ASTM C 478, individual steps or ladder. Omit steps for manholes less than 48 inches deep.
 9. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.
- B. Heavy-Traffic Precast Concrete Manholes: ASTM C 913; designed according to ASTM C 890 for A-16, heavy-traffic, structural loading; of depth, shape, and dimensions indicated, with provision for rubber gasketed joints.
1. Ballast: Increase thickness of one or more precast concrete sections or add concrete to structure, as required to prevent flotation.
 2. Gaskets: Rubber.
 3. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch-diameter frame and cover.
 4. Steps: ASTM C 478, individual steps or ladder. Omit steps for manholes less than 48 inches deep.
 5. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.
- C. Cast-in-Place Concrete Manholes: Construct of reinforced-concrete bottom, walls, and top; designed according to ASTM C 890 for A-16, heavy-traffic, structural loading; of depth, shape, dimensions, and appurtenances indicated.
1. Ballast: Increase thickness of concrete, as required to prevent flotation.
 2. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch-diameter frame and cover.
 3. Steps: ASTM C 478, individual steps or ladder. Omit steps for manholes less than 48 inches deep.
- D. Manhole Frames and Covers: ASTM A 536, Grade 60-40-18, ductile-iron castings designed for heavy-duty service. Include 24-inch ID by 7- to 9-inch riser with 4-inch minimum width flange, and 26-inch- diameter cover. Include indented top design with lettering "STORM SEWER" cast into cover.

2.4 CATCH BASINS

- A. Normal-Traffic, Precast Concrete Catch Basins: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for rubber gasketed joints.
1. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section and having separate base slab or base section with integral floor.
 2. Riser Sections: 4-inch minimum thickness, 48-inch diameter, and lengths to provide depth indicated.
 3. Top Section: Concentric-cone type, unless eccentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
 4. Gaskets: ASTM C 443, rubber.
 5. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch diameter frame and grate.
 6. Steps: ASTM C 478 individual steps or ladder. Omit steps for catch basins less than 48 inches deep.
 7. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.

- B. Heavy-Traffic, Precast Concrete Catch Basins: ASTM C 913, precast, reinforced concrete; designed according to ASTM C 890 for A-16, heavy-traffic, structural loading; of depth, shape, and dimensions indicated, with provision for rubber gasketed joints.
1. Gaskets: Rubber.
 2. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch diameter frame and grate.
 3. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.
 4. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.
- C. Cast-in-Place Concrete, Catch Basins: Construct of reinforced concrete; designed according to ASTM C 890 for structural loading; of depth, shape, dimensions, and appurtenances indicated.
1. Bottom, Walls, and Top: Reinforced concrete.
 2. Channels and Benches: Concrete.
 3. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.
- D. Frames and Grates: ASTM A 536, Grade 60-40-18, ductile iron designed for heavy-duty service. Include flat grate with small square or short-slotted drainage openings.
1. Size: 24 by 24 inches minimum, unless otherwise indicated.
 2. Grate Free Area: Approximately 50 percent, unless otherwise indicated.
- E. Frames and Grates: ASTM A 536, Grade 60-40-18, ductile iron designed for heavy-duty service. Include 24-inch ID by 7- to 9-inch riser with 4-inch minimum width flange, and 26-inch diameter flat grate with small-square or short-slotted drainage openings.
1. Grate Free Area: Approximately 50 percent, unless otherwise indicated.

2.5 CONCRETE

- A. General: Cast-in-place concrete according to ACI 318, ACI 350R, and the following:
1. Cement: ASTM C 150, Type II.
 2. Fine Aggregate: ASTM C 33, sand.
 3. Coarse Aggregate: ASTM C 33, crushed gravel.
 4. Water: Potable.
- B. Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water-cementitious ratio.
1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
 2. Reinforcement Bars: ASTM A 615, Grade 60, deformed steel.
- C. Structure Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi minimum, with 0.45 maximum water-cementitious ratio.

1. Include channels and benches in manholes.
 - a. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
 - 1) Invert Slope: 2 percent through manhole.
 - b. Benches: Concrete, sloped to drain into channel.
 - 1) Slope: 4 percent.
2. Include channels in catch basins.
 - a. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
 - 1) Invert Slope: 2 percent through catch basin.
- D. Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water-cementitious ratio.
 1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
 2. Reinforcement Bars: ASTM A 615, Grade 60, deformed steel.

3.0 - EXECUTION

3.1 EARTHWORK

- A. Excavating, trenching, and backfilling are specified in Division 2 Section "Earthwork."

3.2 IDENTIFICATION

- A. Materials and their installation are specified in Division 2 Section "Earthwork." Arrange for installing green warning tapes directly over piping and at outside edges of underground structures.
 1. Use or detectable warning tape over ferrous piping.
 2. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.3 PIPING APPLICATIONS

- A. General: Include watertight, silt-tight, or soil-tight joints, unless watertight or silt-tight joints are indicated.
- B. Refer to Part 2 of this Section for detailed specifications for pipe and fitting products listed below. Use pipe, fittings, and joining methods according to applications indicated.
- C. Gravity-Flow Piping: As indicated on the drawings.

3.4 INSTALLATION, GENERAL

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab or drag in line and pull past each joint as it is completed.
- C. Use manholes for changes in direction, unless fittings are indicated. Use fittings for branch connections, unless direct tap into existing sewer is indicated.
- D. Use proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. Install gravity-flow piping and connect to building's storm drains, of sizes and in locations indicated. Terminate piping as indicated.
 - 1. Install piping pitched down in direction of flow, at minimum slope of 1 percent, unless otherwise indicated.
 - 2. Install piping with 36-inch minimum cover, unless otherwise indicated.
- F. Extend storm drainage piping and connect to building's storm drains, of sizes and in locations indicated. Terminate piping as indicated.

3.5 PIPE JOINT CONSTRUCTION AND INSTALLATION

- A. General: Join and install pipe and fittings according to installations indicated.
- B. Install with top surfaces of components, except piping, flush with finished surface.
- C. PE Pipe and Fittings: As follows:
 - 1. Join pipe, tubing, and fittings with couplings for soil-tight joints according to manufacturer's written instructions.
 - 2. Install according to ASTM D 2321 and manufacturer's written instructions.
 - 3. Install corrugated piping according to the Corrugated Polyethylene Pipe Association's "Recommended Installation Practices for Corrugated Polyethylene Pipe and Fittings."
- D. PVC Pressure Pipe and Fittings: Join and install according to AWWA M23.
- E. PVC Sewer Pipe and Fittings: As follows:
 - 1. Join pipe and gasketed fittings with gaskets according to ASTM D 2321.
 - 2. Install according to ASTM D 2321.
- F. Concrete Pipe and Fittings: Install according to ACPA's "Concrete Pipe Installation Manual." Use the following seals:

1. Round Pipe and Fittings: ASTM C 443, rubber gaskets.
 2. Arch Pipe: ASTM C 877, Type I, sealing bands.
- G. System Piping Joints: Make joints using system manufacturer's couplings, unless otherwise indicated.
- H. Join piping made of different materials or dimensions with couplings made for this application. Use couplings that are compatible with and that fit both systems' materials and dimensions.

3.6 MANHOLE INSTALLATION

- A. General: Install manholes, complete with appurtenances and accessories indicated.
- B. Form continuous concrete channels and benches between inlets and outlet.
- C. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 3 inches above finished surface elsewhere, unless otherwise indicated.
- D. Install precast concrete manhole sections with gaskets according to ASTM C 891.
- E. Construct cast-in-place manholes as indicated.

3.7 CATCH-BASIN INSTALLATION

- A. Construct catch basins to sizes and shapes indicated.
- B. Set frames and grates to elevations indicated.

3.8 STORM DRAINAGE INLET AND OUTLET INSTALLATION

- A. Construct inlet head walls, aprons, and sides of reinforced concrete, as indicated.
- B. Construct riprap of broken stone, as indicated.
- C. Install outlets that spill onto grade, anchored with concrete, where indicated.
- D. Install outlets that spill onto grade, with flared end sections that match pipe, where indicated.
- E. Construct energy dissipators at outlets, as indicated.

3.9 CONCRETE PLACEMENT

- A. Place cast-in-place concrete according to ACI 318 and ACI 350R.

3.10 TAP CONNECTIONS

- A. Make connections to existing piping and underground structures so finished Work complies as nearly as practical with requirements specified for new Work.
- B. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and

encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.

- C. Make branch connections from side into existing piping. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
- D. Make branch connections from side into existing piping, NPS 18 or larger, or to underground structures by cutting opening into existing unit large enough to allow 3 inches of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall, unless otherwise indicated. On outside of pipe or structure wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from connection to undisturbed ground.
 - 1. Use concrete that will attain minimum 28-day compressive strength of 3000 psi, unless otherwise indicated.
 - 2. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.
- E. Protect existing piping and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

3.11 CLOSING ABANDONED STORM DRAINAGE SYSTEMS

- A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use either procedure below:
 - 1. Close open ends of piping with at least 8-inch- thick, brick masonry bulkheads.
 - 2. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.
- B. Abandoned Structures: Excavate around structure as required and use one procedure below:
 - 1. Remove structure and close open ends of remaining piping.
 - 2. Remove top of structure down to at least 36 inches below final grade. Fill to within 12 inches of top with stone, rubble, gravel, or compacted dirt. Fill to top with concrete.
 - 3. Backfill to grade according to Division 2 Section "Earthwork."

3.12 FIELD QUALITY CONTROL

- A. Clear interior of piping and structures of dirt and superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed.
 - 1. In large, accessible piping, brushes and brooms may be used for cleaning.

2. Place plug in end of incomplete piping at end of day and when work stops.
 3. Flush piping between manholes and other structures to remove collected debris, if required by authorities having jurisdiction.
- B. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
1. Submit separate reports for each system inspection.
 2. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
 - c. Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.
 3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
 4. Reinspect and repeat procedure until results are satisfactory.
- C. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
1. Do not enclose, cover, or put into service before inspection and approval.
 2. Test completed piping systems according to authorities having jurisdiction.
 3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
 4. Submit separate reports for each test.
 5. Leaks and loss in test pressure constitute defects that must be repaired.
 6. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

END OF SECTION 02630

SITE CONCRETE WALKS, CURBS & PAVING - SECTION 02751

1.0 – 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 exterior cement concrete for the following:
 - 1. Driveways and roadways.
 - 2. Parking lots.
 - 3. Curbs and gutters.
 - 4. Walkways.
 - 5. Site walls and footings.
- B. Related Sections include the following:
 - 1. Division 2 Section "Earthwork" for subgrade preparation, grading, and subbase course.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, expansive 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 pavement mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
- C. 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:
- D. Material Certificates: Signed by manufacturers certifying that each of the following materials complies with requirements:
 - 1. Cementitious materials and aggregates.
 - 2. Steel reinforcement and reinforcement accessories.
 - 3. Fiber reinforcement.
 - 4. Admixtures.
 - 5. Curing compounds.
 - 6. Applied finish materials.
 - 7. Bonding agent or adhesive.
 - 8. Joint fillers.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed pavement 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: Manufacturer of 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 Mix Concrete Association's Plant Certification Program.
- 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.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant and each aggregate from one source.
- E. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by the requirements of the Contract Documents.
- F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixes.

1.6 PROJECT CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required other construction activities.

2.0 - PRODUCTS

2.1 FORMS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.
 - 1. Use flexible or curved forms for curves of a radius 100 feet or less.
- B. 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.

2.2 STEEL REINFORCEMENT

- A. Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.
- B. Deformed-Steel Welded Wire Fabric: ASTM A 497, flat sheet.
- C. Epoxy-Coated Welded Wire Fabric: ASTM A 884, Class A, plain steel.
- D. Reinforcement Bars: ASTM A 615, Grade 60, deformed.

- E. Epoxy-Coated Reinforcement Bars: ASTM A 775; with ASTM A 615, Grade 60, deformed bars.
- F. Steel Bar Mats: ASTM A 184; with ASTM A 615, Grade 60, deformed bars; assembled with clips.
- G. Plain Steel Wire: ASTM A 82, as drawn.
- H. Epoxy-Coated Wire: ASTM A 884, Class A coated, plain steel.
- I. Joint Dowel Bars: Plain steel bars, ASTM A 615, Grade 60. Cut bars true to length with ends square and free of burrs.
- J. Epoxy-Coated Joint Dowel Bars: ASTM A 775; with ASTM A 615, Grade 60, plain steel bars.
- K. Tie Bars: ASTM A 615, Grade 60, deformed.
- L. Hook Bolts: ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6), internally and externally threaded. Design hook-bolt joint assembly to hold coupling against pavement form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.
- M. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcement bars, welded wire fabric, and dowels 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. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.
 - 2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer coated wire bar supports.
- N. Epoxy Repair Coating: Liquid two-part epoxy repair coating, compatible with epoxy coating on reinforcement.

2.3 CONCRETE MATERIALS

- A. General: Use the same brand and type of cementitious material from the same manufacturer throughout the Project.
- B. Portland Cement: ASTM C 150, Type I or II.
 - 1. Fly Ash: ASTM C 618, Class F or C. Use one brand of cement throughout project unless otherwise accepted.
 - 2. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- C. Blended Hydraulic Cement: ASTM C 595M, Type IS, portland blast-furnace slag cement.
- D. Blended Hydraulic Cement: ASTM C 595M, Type IP portland pozzolan cement.
- E. Blended Hydraulic Cement: ASTM C 595M, Type I (PM) pozzolan-modified portland cement.

- F. Blended Hydraulic Cement: ASTM C 595M, Type I (SM) slag-modified portland cement.
- G. Aggregate: ASTM C 33, uniformly graded, from a single source, with coarse aggregate as follows:
 - 1. Class: 4S.
 - 2. Class: 4M.
 - 3. Class: 1N.
 - 4. Maximum Aggregate Size: 1-1/2 inches nominal.
 - 5. Maximum Aggregate Size: 1 inch nominal.
 - 6. Maximum Aggregate Size: 3/4 inch nominal.
 - 7. Do not use fine or coarse aggregates containing substances that cause spalling.
- H. Water: ASTM C 94.

2.4 ADMIXTURES

- A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cement and to be compatible with other admixtures.
- 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 Non-Chloride Accelerating Admixture: ASTM C 494, Type E.
- F. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

2.5 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. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- E. Clear Solvent-Borne Liquid-Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.
- F. Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.
- G. White Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 2, Class B.

2.6 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.
- B. Coloring Agent: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, nonfading, and resistant to lime and other alkalis.
 - 1. Color: As selected by Architect from manufacturer's full range.
- C. Pavement-Marking Paint: Alkyd-resin type; ready mixed; complying with FS TT-P-115, Type I, or AASHTO M 248, Type N.
 - 1. Color: As indicated.
- D. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery with emery aggregate containing not less than 50 percent aluminum oxide and not less than 25 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.
- E. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- F. Rock Salt: Sodium chloride crystals, kiln dried, coarse gradation with 100 percent passing 3/8-inch sieve and 85 percent retained on a No. 8 sieve.
- G. 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, and as follows:
 - 1. Type II, non-load bearing, for bonding freshly mixed concrete to hardened concrete.
 - 2. Types I and II, non-load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
 - 3. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- H. Chemical Surface Retarder: Water-soluble, liquid set retarder with color dye, for horizontal concrete surface application, capable of temporarily delaying final hardening of concrete to a depth of 1/8 to 1/4 inch.
- I. Colored Dry-Shake Hardener: Factory-packaged dry combination of portland cement, graded quartz aggregate, coloring pigments, and plasticizing admixture. Use coloring pigments that are finely ground, nonfading mineral oxides interground with cement.
 - 1. Color: As selected by Architect from manufacturer's full range.

2.7 CONCRETE MIXES

- A. Prepare design mixes, proportioned according to ACI 211.1 ACI 301 and ACI 318-89, Section 5.3, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.

- B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the trial batch method.
 - 1. Do not use Owner's field quality-control testing agency as the independent testing agency.
- C. Proportion mixes to provide concrete with the following properties:
 - 1. Compressive Strength (28 Days): 4000 psi for site walls and footings.
 - 2. Compressive Strength (28 Days): 3000 psi unless noted.
 - 3. Maximum Water-Cementitious Materials Ratio: 0.50 for site walls.
 - 4. Maximum Water-Cementitious Materials Ratio: 0.53 unless noted.
 - 5. Slump Limit: 3-5 inches.
- D. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 - 1. Fly Ash: 25 percent.
 - 2. Combined Fly Ash and Pozzolan: 25 percent.
 - 3. Ground Granulated Blast-Furnace Slag: 50 percent.
 - 4. Combined Fly Ash or Pozzolan, and Ground Granulated Blast-Furnace Slag: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.
- E. 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 or minus 1.5 percent:
 - 1. Air Content: 5.5 percent for 1-1/2-inch maximum aggregate.
 - 2. Air Content: 6.0 percent for 1-inch maximum aggregate.
 - 3. Air Content: 6.0 percent for 3/4-inch maximum aggregate.
- F. Synthetic Fiber: Uniformly disperse in concrete mix at manufacturer's recommended rate, but not less than 1.0 lb/cu. yd.
- G. Coloring Agent: Add coloring agent to mix according to manufacturer's written instructions.

2.8 CONCRETE MIXING

- A. Ready-Mixed Concrete: Comply with requirements and with ASTM C 94 and ASTM C 1116.
 - 1. When air temperature is between 85 deg F and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Comply with requirements and measure, batch, and mix concrete materials and concrete according to ASTM C 94. Mix concrete materials in appropriate drum-type batch machine mixer.
 - 1. For mixers of 1 cu. yd. or smaller capacity, continue mixing at least one and one-half minutes, but not more than five minutes after ingredients are in mixer, before any part of batch is released.
 - 2. For mixers of capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.

3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added.

3.0 - EXECUTION

3.1 PREPARATION

- A. Proof-roll prepared subbase surface to check for unstable areas and verify need for additional compaction. Proceed with pavement only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.
- B. Remove loose material from compacted subbase surface immediately before placing concrete.

3.2 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form release agent to ensure separation from concrete without damage.

3.3 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating reinforcement and with recommendations in CRSI's "Placing Reinforcing Bars" for placing and supporting reinforcement.
 1. Apply epoxy repair coating to uncoated or damaged surfaces of epoxy-coated reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.
- D. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.
- E. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch overlap to adjacent mats.

3.4 JOINTS

- A. General: Construct construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.

1. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour, unless pavement terminates at isolation joints.
1. Provide preformed galvanized steel or plastic keyway-section forms or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
 2. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated.
 3. Provide tie bars at sides of pavement strips where indicated.
 4. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 5. Use epoxy bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.
1. Locate expansion joints at intervals of 50 feet, unless otherwise indicated.
 2. Extend joint fillers full width and depth of joint.
 3. Terminate joint filler less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
 4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
 5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
 6. Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- D. Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.
- E. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:
1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with groover tool to the following radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.
 - a. Radius: 1/4 inch.
 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.

- F. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to the following radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

1. Radius: 1/4 inch.

3.5 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcement steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- B. Remove snow, ice, or frost from subbase surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subbase to provide a uniform dampened condition at the time concrete is placed. Do not place concrete around manholes or other structures until they are at the required finish elevation and alignment.
- D. Comply with requirements and with recommendations in ACI 304R for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to concrete during delivery, at Project site, or during placement.
- F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- G. Consolidate concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures to consolidate concrete according to recommendations in ACI 309R.
1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.
- H. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.
1. Remove and replace portions of bottom layer of concrete that have been placed more than 15 minutes without being covered by top layer, or use bonding agent if approved by Architect.
- I. Screed pavement surfaces with a straightedge and strike off. Commence initial floating using bull floats or darbies to form an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading dry-shake surface treatments.
- J. Curbs and Gutters: When automatic machine placement is used for curb and gutter placement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce curbs and gutters to required cross section,

lines, grades, finish, and jointing as specified for formed concrete. If results are not approved, remove and replace with formed concrete.

- K. Slip-Form Pavers: When automatic machine placement is used for pavement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce pavement to required thickness, lines, grades, finish, and jointing as required for formed pavement.
 - 1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of paver machine during operations.
- L. When adjoining pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained 85 percent of its 28-day compressive strength.
- M. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.
- N. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows when hot-weather conditions exist:
 - 1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 deg F. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Cover reinforcement steel with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 - 3. Fog-spray forms, reinforcement steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.6 CONCRETE FINISHING

- A. General: Wetting of concrete surfaces during screeding, initial floating, or finishing operations is prohibited.
- B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and the concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots, and fill low spots. Refloat surface immediately to uniform granular texture.

1. Burlap Finish: Drag a seamless strip of damp burlap across float-finished concrete, perpendicular to line of traffic, to provide a uniform, gritty texture.
2. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.
3. Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface 1/16 to 1/8 inch deep with a stiff-bristled broom, perpendicular to line of traffic.

3.7 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 follow recommendations in ACI 305R for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Begin curing after finishing concrete, but not before free water has disappeared from concrete surface.
- D. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:
 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 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, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 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.

3.8 PAVEMENT TOLERANCES

- A. Comply with tolerances of ACI 117 and as follows:
 1. Elevation: 1/4 inch.
 2. Thickness: Plus 3/8 inch, minus 1/4 inch.
 3. Surface: Gap below 10-foot- long, unleveled straightedge not to exceed 1/4 inch.

4. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch.
5. Vertical Alignment of Tie Bars and Dowels: 1/4 inch.
6. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch.
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches.
8. Contraction Joint Depth: Plus 1/4 inch, no minus.
9. Joint Width: Plus 1/8 inch, no minus.

3.9 PAVEMENT MARKING

- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.
- B. Allow concrete pavement to cure for 30 days and be dry before starting first coat of pavement marking. Second coat shall be placed 30 – 60 days after the first.
- C. Sweep and clean surface to eliminate loose material and dust.
- D. Apply 2 coats of paint with mechanical equipment to produce pavement markings of dimensions indicated with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils per coat.

3.10 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing and inspection agency to sample materials, perform tests, and submit test reports during concrete placement. Sampling and testing for quality control may include those specified in this Article.
- B. Testing Services: Testing shall be performed according to the following requirements:
 1. Sampling Fresh Concrete: Representative samples of fresh concrete shall be obtained according to ASTM C 172, except modified for slump to comply with ASTM C 94.
 2. Slump: ASTM C 143; one test at point of placement for each compressive-strength test, but not less than one test for each day's pour of each type of concrete. Additional tests will be required when concrete consistency changes.
 3. Air Content: ASTM C 231, pressure method; one test for each compressive-strength test, but not less than one test for each day's pour of each type of air-entrained concrete.
 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 set of compressive-strength specimens.
 5. Compression Test Specimens: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless otherwise indicated. Cylinders shall be molded and stored for laboratory-cured test specimens unless field-cured test specimens are required.
 6. Compressive-Strength Tests: ASTM C 39; one set for each day's pour of each concrete class exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd.. One specimen shall be tested at 7 days and two specimens at 28 days; one specimen shall be retained in reserve for later testing if required.

7. When frequency of testing will provide fewer than five compressive-strength tests for a given class of concrete, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 8. When total quantity of a given class of concrete is less than 50 cu. yd. Architect may waive compressive-strength testing if adequate evidence of satisfactory strength is provided.
 9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, current operations shall be evaluated and corrective procedures shall be provided for protecting and curing in-place concrete.
 10. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive compressive-strength test results equal or exceed specified compressive strength and no individual compressive-strength test result falls below specified compressive strength by more than 500 psi.
- C. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 24 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing agency, concrete type and class, location of concrete batch in pavement, 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.
- D. Additional Tests: Testing agency shall make additional tests of the concrete when test results indicate slump, air entrainment, concrete strengths, or other requirements have not been met, as directed by Architect. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

3.11 REPAIRS AND PROTECTION

- A. Remove and replace concrete pavement that is broken, damaged, or defective, or does not meet requirements in this Section.
- B. Drill test cores where directed by Architect when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.
- C. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 02751

1.0 - GENERAL

1.1 Scope

The work of this section shall include all labor, material and equipment necessary to furnish and install Fences, Gates and accessories hereafter specified and/or designated on the drawings.

1.2 Manufacturer

Fence and Gate Assembly shall be Anchor, Cyclone, Allied or approved equal.

1.3 Substitutions

Fence and Gates of other manufacturers may be substituted, provided that in the architect's opinion, the Fence and Gates are equal to that specified, and approval is obtained not less than seven (7) days prior to date set for opening bids.

1.4 Shop Drawings

Shop drawings will be submitted to the Architect for approval before fabrication. These drawings to show: size, arrangement and type of material, connections and relationship to adjacent work.

1.5 Guarantee

The Fence and Gate Contractor shall guarantee all materials and workmanship covered by this section for a period of one (1) year from Date of Acceptance, normal wear and tear excepted.

1.6 Finish

Provide unfinished galvanized material unless noted otherwise. If a color is indicated, provide finished galvanized material accordingly.

2.0 - PRODUCTS

2.1 Materials

- A. Mesh: 2" weave, composed of No. 9 wire of 1,200 lb. minimum breaking strength. Heavy zinc coat after weaving by hot dip smelter process. Mesh to be 6'-0" high.
- B. Corner terminal and gate posts: 2-1/2" sq. tubing of 5.70 lb. per ft. or 2-7/8" round tubing of 5.79 lb. per ft. galvanized steel.
- C. Line posts: 2-1/4" sq. H-beam of 4.1 lbs. per foot or 2-3/8" round tubing of 3.65 lbs. per ft., galvanized steel.
- D. Top rail: 1-5/8" diameter o.d. galvanized steel, 18'-0" minimum length with 6" long couplings.
- E. Middle rail: None required.
- F. Extension Arms: Pressed steel, zinc coated after fabrication, formed with sleeve for top rail and tongue for permanently attaching 3 strands of barbed wire at 45 degree angle.
- G. Barbed Wire: Zinc coated 4 point thickset with barbs spaced 5" apart.
- H. Truss Braces: 1-5/8" o.d., galvanized steel at mid height of fence with 3/8" truss rod

and turnbuckle attachment. Install between each gate post and adjacent line post. Install two at each corner post (one on each side.)

- I. Bottom Wires: At bottom of all fence furnish No. 7 gauge coil spring bottom tension wire.
- J. Gates: Sizes as shown with frame made up of either 1-1/2" square tubing (min. weight 1.90 lbs. per ft.) or 1-5/8" o.d. round tubing (min. weight 1.806 lbs. per ft.). Join corners at corners by welding to form a rigid panel. Fill with same mesh as used on fence, attached on all four sides with adjustable hook bolts and tension rods. Provide fulcrum latch with provision for padlocking. On double gates provide lift rod and securely anchored keeper.

3.0 - EXECUTION

3.1 Installation

Install corner and gate posts into 12" diameter x 40" deep hole filled with concrete. Install line posts on 10'-0" maximum centers into 10" diameter x 32" deep holes filled with concrete. Attach top rail, truss braces and gates to posts with standard malleable fittings. Install mesh with stretcher bars and top wire clips.

3.2 Clean Up

- A. The contractor shall promptly remove from the site all excess excavated materials and other debris resulting from fence construction.
- B. Construction fencing shall be removed from job site prior to final inspection.

END OF SECTION

SECTION 03300 - 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 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
 - 1. Footings.
 - 2. Slabs-on-grade.
- B. Related Sections include the following:
 - 1. Section 02300 "Earth Work" for drainage fill under slabs-on-grade.
 - 2. Section 02751 for concrete pavement and walks.
 - 3. Division 5 for metals.

1.3 DEFINITIONS

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

1.4 SUBMITTALS

- A. Shop Drawings, General:
 - 1. Submit all shop drawings on one reproducible print and two copies only. The reproducible print will be returned. All other reproductions required by the Contractor are the responsibility of the Contractor and shall be made after reproducible is returned.
 - 2. The contractor shall fill out the Concrete Submittal Checklist and include it as part of his mix design and/or shop drawing submittal package(s). Submittals without the checklist will be returned unchecked as an incomplete submittal. The checklist sheet is located at the end of this specification section.
 - a. If there are questions, clarifications, modifications, or other items where information, a response, or approval is requested, such items must be written on the checklist. Only indicating such items on the shop drawings or within the calculations is not sufficient. Where items are not specifically listed on the checklist and subsequently not explicitly approved by the Structural Engineer of Record, such items are not to be considered approved or considered.
 - 3. All shop drawings which are resubmitted for any reason shall have all revised items clouded or identified for each submittal.

4. Contract documents shall not be used for shop drawing, including erection plans or details.
- B. Product Data: For each type of product indicated.
- C. Design Mixtures: Prepare design mixes for each type and strength of concrete by either laboratory trial mixtures or field experience methods as specified in ACI 318-05 Section 5.3. If trial mixtures method used, the contractor is to provide and use an independent testing facility for preparing and reporting proposed mix designs.
1. All concrete mix designs shall include the following information:
 - a. Proportions of cement, fine and coarse aggregate and water.
 - b. Water/cement ratio, design strength, slump and air content.
 - c. Type of cement and aggregates.
 - d. Type and dosage of all admixtures.
 - e. Type, color and dosage of integral coloring compounds, where applicable.
 - f. Special requirements for pumping.
 - g. Any special characteristics of the mix which require precautions in the mixing, placing or finishing techniques to achieve the finished product specified.
 - h. Dated test data for the laboratory trial mixture or field experience method.
 - i. Material certifications (materials shall meet the requirements of section 2.5 below)
 - 1) Cementitious materials.
 - 2) Admixtures.
 - 3) Aggregates
 2. Submit written reports to Architect and Structural Engineer of Record of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until proposed mix designs have been reviewed and approved by Architect and Structural Engineer of Record.
- D. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- E. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.
1. Shop drawings for formwork, prepared for fabrication and erection of forms for specific finished concrete surfaces. Show form construction including jointing, special form joint or reveals, location and pattern of form tie placement, and other items that affect exposed concrete visually.
 - a. Architect's review is for general architectural applications and features only. Design of formwork for structural stability and efficiency is Contractor's responsibility.
- F. Samples: Submit samples of materials as requested by Architect, including names, sources, and descriptions for waterstops, vapor retarder and other products indicated by Architect.
- G. Welding certificates.
- H. Qualification Data: For Installer, manufacturer and testing agency.
- I. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:

1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.

J. Material Certificates: For each of the following, signed by manufacturers:

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

K. Floor surface flatness and levelness measurements to determine compliance with specified tolerances.

L. Field quality-control test and inspection reports.

M. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

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

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for 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-01 or an equivalent certification program.
2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.

D. The Owner shall employ an approved Testing Agency to perform concrete and concrete related tests and inspections (that are not specifically noted as the contractor's responsibility) as

required by the Building Code, Project Documents, the Architect, and the Structural Engineer of Record.

- E. The contractor shall employ at his expense an approved Testing Agency as defined above to perform the following:
 - 1. Evaluation of trial mixtures and/or concrete testing for mix design submission.
 - 2. Qualification of proposed materials and establishment of concrete mixtures.
 - 3. Other testing services needed or required by the contractor.
- F. Materials and installed work may require testing and retesting at any time during progress of work. Tests, including retesting of rejected materials for installed work, shall be done at Contractor's expense.
- G. Testing Responsibilities of the Contactor:
 - 1. Submit data on qualifications of Contractor's proposed testing agency. Use of testing services will not relive the Contractor of the responsibility to furnish materials and construction in full compliance with the Contract Documents.
 - 2. Furnish any labor necessary to assist Owner's testing agency in obtaining and handling samples at the project site or at the source of materials.
 - 3. Advise Owners Testing Agency at least 24 hours in advance of operations to allow for completion of quality tests and assignment of personnel.
 - 4. At the Contractor's expense, provide and maintain for the sole use of the Owner's Testing agency adequate facilities for the safe storage and proper curing of concrete test specimens on the project site for initial curing as required by ASTM C31.
- H. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.
- I. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code-Reinforcing Steel."
- J. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301, "Specification for Structural Concrete," Sections 1 through 5.
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
 - 3. ACI 302 "Guide for Concrete Floor and Slab Construction".
 - 4. ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete".
 - 5. ACI 305 "Hot Weather Concreting".
 - 6. ACI 306 "Cold Weather Concreting".
 - 7. ACI 309 "Guide for Consolidation of Concrete".
 - 8. ACI 347 "Recommended Practice for Concrete Formwork".
 - 9. Concrete Reinforcing Steel Institute (CRSI), "Manual of Standard Practice."
- K. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations, shoring and reshoring procedures, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
- B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 - 2. Products: Subject to compliance with requirements, provide one of the products specified.
 - 3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
 - 4. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 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. Plywood, metal, or other approved panel materials.
 - 2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
 - a. High-density overlay, Class 1 or better.
 - b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
 - c. Structural 1, B-B or better; mill oiled and edge sealed.
 - d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.
- 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 (19 by 19 mm), 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, and adhesion of membranes to concrete.
 - 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 (25 mm) to the plane of exposed concrete surface.
 - 2. Furnish ties that, when removed, will leave holes no larger than 1 inch (25 mm) in diameter in concrete surface.
 - 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.3 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- B. Galvanized Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420) ASTM A 706/A 706M, deformed bars, ASTM A 767/A 767M, Class I zinc coated after fabrication and bending.
- C. Epoxy-Coated Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420) ASTM A 706/A 706M, deformed bars, epoxy coated, with less than 2 percent damaged coating in each 12-inch (300-mm) bar length.
- D. Plain-Steel Wire: ASTM A 82, as drawn.
- E. Deformed-Steel Wire: ASTM A 496.
- F. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.
- G. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.

2.4 REINFORCEMENT ACCESSORIES

- A. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775/A 775M.
- B. Zinc Repair Material: ASTM A 780, zinc-based solder, paint containing zinc dust, or sprayed zinc.
- C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," 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 steel wire or CRSI Class 2 stainless-steel bar supports.
2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
3. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.

2.5 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
1. Portland Cement: ASTM C 150, Type I, gray or white. Supplement with the following:
 - a. Fly Ash: ASTM C 618, Class C or F.
 - 1) Limit use of fly ash to not exceed 25 percent of cementitious content by weight.
 - b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
 - 1) Limit use of Ground Granulated Blast-Furnace Slag to not exceed 50 percent of cementitious content by weight.
 2. Blended Hydraulic Cement: ASTM C 595, Type [IS, portland blast-furnace slag] [IP, portland-pozzolan] [I (PM), pozzolan-modified portland] [I (SM), slag-modified portland] cement.
- B. Silica Fume: ASTM C 1240, amorphous silica.
- C. Normal-Weight Aggregates: ASTM C 33, Class 3M coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
1. Maximum Coarse-Aggregate Size: 3/4 inch (19 mm) nominal.
 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- D. Water: ASTM C 94/C 94M and potable.

2.6 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride. Use of admixture must be approved by the Structural Engineer of Record. Include admixtures as part of mix design submittal.
1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.

6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
- C. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494/C 494M, Type C. Set-Accelerating Corrosion-Inhibiting Admixtures must be approved by the Structural Engineer of Record. Include admixtures as part of mix design submittal.
1. Available Products:
 - a. Boral Material Technologies, Inc.; Boral BCN.
 - b. Euclid Chemical Company (The); Eucon CIA.
 - c. Grace Construction Products, W. R. Grace & Co.; DCI.
 - d. Master Builders, Inc.; Rheocrete CNI.
 - e. Sika Corporation; Sika CNI.
- D. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete. Non-Set-Accelerating Corrosion-Inhibiting Admixture must be approved by the Structural Engineer of Record. Include admixtures as part of mix design submittal.
1. Available Products:
 - a. Axim Concrete Technologies; Catexol 1000CI.
 - b. Boral Material Technologies, Inc.; Boral BCN2.
 - c. Grace Construction Products, W. R. Grace & Co.; DCI-S.
 - d. Master Builders, Inc.; Rheocrete 222+.
 - e. Sika Corporation; FerroGard-901.
- E. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis. See architectural drawings and site plan for concrete requiring color pigment.
1. Available Manufacturers:
 - a. Bayer Corporation.
 - b. ChemMasters.
 - c. Conspec Marketing & Manufacturing Co., Inc.; a Dayton Superior Company.
 - d. Davis Colors.
 - e. Elementis Pigments, Inc.
 - f. Hoover Color Corporation.
 - g. Lambert Corporation.
 - h. Scofield, L. M. Company.
 - i. Solomon Colors.
 2. Color: As selected by Architect from manufacturer's full range.

2.7 WATERSTOPS

- A. Flexible PVC Waterstops: CE CRD-C 572, with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

1. Available Manufacturers:
 - a. Bometals, Inc.
 - b. Greenstreak.
 - c. Meadows, W. R., Inc.
 - d. Tamms Industries, Inc.
 - e. Vinylex Corp.
2. Profile: As indicated.
3. Dimensions: As indicated; nontapered.

- B. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch (19 by 25 mm).

1. Available Products:
 - a. Greenstreak; Swellstop.
 - b. Henry Company, Sealants Division; Hydro-Flex.
 - c. TCMiraDRI; Mirastop.

2.8 VAPOR RETARDERS

- A. Underslab Vapor Barrier 1: 15 mil minimum thickness, Multi-layer, fabric-, cord-, grid-, or aluminum-reinforced, high density polyethylene, or polyolefin equivalent, complying with ASTM E 1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. Single ply polyethylene is prohibited.
1. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations in vapor retarder.
 2. Basis of Design Product:
 - a. STEGO INDUSTRIES LLC Product Stego Wrap (15-mil) Vapor Barrier ; www.stegoindustries.com
 3. Other Acceptable products
 - a. Fortifiber Building Systems Group Product Moistop Ultra® 15; www.fortifiber.com.
 - b. Reef Industries Product Griffolyn 15 Mil ; www.reefindustries.com.
 - c. W.R. Meadows Inc. Product PERMINATOR 15 ; www.wrmeadows.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. 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 (37.5-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.
- C. 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 3/8-inch (9.5-mm) sieve, 10 to 30 percent passing a No. 100 (0.15-mm) sieve, and at least 5 percent passing No. 200 (0.075-mm) sieve; complying with deleterious substance limits of ASTM C 33 for fine aggregates.

2.9 FLOOR AND SLAB TREATMENTS

- A. General: The contractor shall coordinate and insure that all floor and slab treatments, curing materials and compounds, finish floor materials, related materials, paints, and repair compounds are compatible.

- B. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; colorless; that penetrates, hardens, and densifies concrete surfaces. To be applied where concrete indicated to be sealed in Architectural Drawings.

1. Available Products:

- a. Burke by Edoco; Titan Hard.
- b. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Intraseal.
- c. Dayton Superior Corporation; Day-Chem Sure Hard.
- d. Euclid Chemical Company (The); Euco Diamond Hard.
- e. L&M Construction Chemicals, Inc.; Seal Hard.
- f. Meadows, W. R., Inc.; Liqui-Hard.
- g. Nox-Crete Products Group, Kinsman Corporation; Duranox.

- C. For additional information on color stained concrete see 03032 Color Stained concrete specifications.

2.10 CURING MATERIALS

- A. General: The contractor shall coordinate and insure that all floor and slab treatments, curing materials and compounds, finish floor materials, related materials, paints, and repair compounds are compatible. Evaporation retarder shall not be used where epoxy floor covering is to be placed; slab shall be wet cured with Absorptive Cover or Moisture-Retaining Cover as indicated below.

1. The contractor shall verify and be responsible for insuring the VOC emission limits of authorities having jurisdiction are not exceeded during the project.

- B. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

1. Available Products:

- a. Burke by Edoco; BurkeFilm.
- b. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Aquafilm.
- c. Dayton Superior Corporation; Sure Film.
- d. Euclid Chemical Company (The); Eucobar.
- e. L&M Construction Chemicals, Inc.; E-Con.
- f. Meadows, W. R., Inc.; Sealtight Evapre.
- g. Nox-Crete Products Group, Kinsman Corporation; Monofilm.
- h. Sika Corporation, Inc.; SikaFilm.

- C. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.

- D. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet or natural fiber matting attached to plastic sheet backing. Acceptable product is Aquacure by DRC, exclusive distributor - Greenstreak Group, Inc. 800-325-9504, or equal.

- E. Water: Potable.

- F. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating. Review curing compounds with manufacturer and waterproofing manufacturer to make sure curing compound does not inhibit adhesion.

1. Available Products:

- a. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
- b. Burke by Edoco; Aqua Resin Cure.
- c. ChemMasters; Safe-Cure Clear.
- d. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; W.B. Resin Cure.
- e. Dayton Superior Corporation; Day Chem Rez Cure (J-11-W).
- f. Euclid Chemical Company (The); Kurez DR VOX.
- g. Kaufman Products, Inc.; Thinfilm 420.
- h. Lambert Corporation; Aqua Kure-Clear.
- i. L&M Construction Chemicals, Inc.; L&M Cure R.
- j. Meadows, W. R., Inc.; 1100 Clear.
- k. Nox-Crete Products Group, Kinsman Corporation; Resin Cure E.
- l. Symons Corporation, a Dayton Superior Company; Resi-Chem Clear Cure.
- m. Tamms Industries, Inc.; Horncure WB 30.
- n. Unitex; Hydro Cure 309.
- o. US Mix Products Company; US Spec Maxcure Resin Clear.
- p. Vexcon Chemicals, Inc.; Certi-Vex Enviocure 100.

- G. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.

1. Available Products:

- a. Anti-Hydro International, Inc.; AH Clear Cure WB.
- b. Burke by Edoco; Spartan Cote WB II.
- c. ChemMasters; Safe-Cure & Seal 20.
- d. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Cure and Seal WB.
- e. Dayton Superior Corporation; Safe Cure and Seal (J-18).
- f. Euclid Chemical Company (The); Aqua Cure VOX.
- g. Kaufman Products, Inc.; Cure & Seal 309 Emulsion.
- h. Lambert Corporation; Glazecote Sealer-20.
- i. L&M Construction Chemicals, Inc.; Dress & Seal WB.
- j. Meadows, W. R., Inc.; Vocomp-20.
- k. Metalcrete Industries; Metcure.
- l. Nox-Crete Products Group, Kinsman Corporation; Cure & Seal 150E.
- m. Symons Corporation, a Dayton Superior Company; Cure & Seal 18 Percent E.
- n. Tamms Industries, Inc.; Clearseal WB 150.
- o. Unitex; Hydro Seal.
- p. US Mix Products Company; US Spec Hydrasheen 15 percent
- q. Vexcon Chemicals, Inc.; Starseal 309.

- H. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, 18 to 25 percent solids, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.

1. Available Products:

- a. Burke by Edoco; Spartan Cote WB II 20 Percent.

- b. ChemMasters; Safe-Cure Clear.
- c. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; High Seal.
- d. Dayton Superior Corporation; Safe Cure and Seal (J-19).
- e. Euclid Chemical Company (The); Diamond Clear VOX.
- f. Kaufman Products, Inc.; SureCure Emulsion.
- g. Lambert Corporation; Glazecote Sealer-20.
- h. L&M Construction Chemicals, Inc.; Dress & Seal WB.
- i. MBT Protection and Repair, Div. of ChemRex; MasterKure-N-Seal VOC.
- j. Meadows, W. R., Inc.; Vocomp-20.
- k. Metalcrete Industries; Metcure 0800.
- l. Nox-Crete Products Group, Kinsman Corporation; Cure & Seal 200E.
- m. Sonneborn, Div. of ChemRex; Kure-N-Seal.
- n. Symons Corporation, a Dayton Superior Company; Cure & Seal 18 Percent E.
- o. Tamms Industries, Inc.; Clearseal WB STD.
- p. Unitex; Hydro Seal 18.
- q. US Mix Products Company; US Spec Radiance UV-25
- r. Vexcon Chemicals, Inc.; Starseal 0800.

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

1. Available Products:

- a. Burke by Edoco; Cureseal 1315.
- b. ChemMasters; Spray-Cure & Seal Plus.
- c. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Sealcure 1315.
- d. Dayton Superior Corporation; Day-Chem Cure and Seal (J-22UV).
- e. Euclid Chemical Company (The); Super Diamond Clear.
- f. Kaufman Products, Inc.; Sure Cure 25.
- g. Lambert Corporation; UV Super Seal.
- h. L&M Construction Chemicals, Inc.; Lumiseal Plus.
- i. Meadows, W. R., Inc.; CS-309/30.
- j. Metalcrete Industries; Seal N Kure 0.
- k. Sonneborn, Div. of ChemRex; Kure-N-Seal 5.
- l. Tamms Industries, Inc.; LusterSeal 300.
- m. Unitex; Solvent Seal 1315.
- n. US Mix Products Company; US Spec CS-25
- o. Vexcon Chemicals, Inc.; Certi-Vex AC 1315

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

1. Available Products:

- a. Burke by Edoco; Cureseal 1315 WB.
- b. ChemMasters; Polyseal WB.
- c. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Sealcure 1315 WB.
- d. Euclid Chemical Company (The); Super Diamond Clear VOX.
- e. Kaufman Products, Inc.; Sure Cure 25 Emulsion.
- f. Lambert Corporation; UV Safe Seal.
- g. L&M Construction Chemicals, Inc.; Lumiseal WB Plus.
- h. Meadows, W. R., Inc.; Vocomp-30.
- i. Metalcrete Industries; Metcure 30.

- j. Symons Corporation, a Dayton Superior Company; Cure & Seal 31 Percent E.
- k. Tamms Industries, Inc.; LusterSeal WB 300.
- l. Unitex; Hydro Seal 25.
- m. US Mix Products Company; US Spec Radiance UV-25.
- n. Vexcon Chemicals, Inc.; Vexcon Starseal 1315.

2.11 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.
- B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 typically unless noted or aromatic polyurea at traffic areas with a Type A shore durometer hardness range of 90 to 95 per ASTM D 2240.
- C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
 - 1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- E. Reglets: Fabricate reglets of not less than 0.0217-inch- (0.55-mm-) thick, galvanized steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

2.12 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
 - 4. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested according to ASTM C 109/C 109M.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by topping manufacturer.

4. Compressive Strength: Not less than 5000 psi (34.5 MPa) at 28 days when tested according to ASTM C 109/C 109M.

2.13 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Concrete type, slump, air content, and maximum water to cementitious content shall be as shown on the Structural Drawings.
- C. Cementitious Materials: Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent. Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 1. Fly Ash: 25 percent.
 2. Combined Fly Ash and Pozzolan: 25 percent.
 3. Ground Granulated Blast-Furnace Slag: 50 percent.
 4. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.
 5. Silica Fume: 10 percent.
 6. Combined Fly Ash, Pozzolans, and Silica Fume: 35 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.
 7. Combined Fly Ash or Pozzolans, Ground Granulated Blast-Furnace Slag, and Silica Fume: 50 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.
- D. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.
- E. Admixtures: Use admixtures according to manufacturer's written instructions.
 1. Use of admixture must be approved by the Structural Engineer of Record. Include admixtures as part of mix design submittal
 2. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
 3. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 4. 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.
 5. Use corrosion-inhibiting admixture in concrete mixtures where indicated.
- F. Slump Limits: Proportion and design mixes to result in slump at point of placement as shown on the drawings.
 1. When use of a Type I or II plasticizing admixture conforming to ASTM C 1017 or when a Type F or G high range water reducing admixture conforming to ASTM C 494 is permitted, concrete shall have a slump of 2 to 4 inches before the admixture is added and a maximum slump of 8 inches at the point of delivery after the admixture is added.

- G. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.14 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Building Members: Proportion normal-weight concrete mixture as follows:
 - 1. Minimum Compressive Strength: As indicated in drawings.
 - 2. Maximum Water-Cementitious Materials Ratio: As indicated in drawings.
 - 3. Slump Limit: As indicated in drawings. 8 inches (200 mm), plus or minus 1 inch (25 mm), for concrete with verified slump indicated in drawings before adding high-range water-reducing admixture or plasticizing admixture].
 - 4. Air Content: As indicated in drawings, at point of delivery for 3/4-inch (19-mm) nominal maximum aggregate size.

2.15 FABRICATING REINFORCEMENT

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

2.16 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.
 - 1. Mixing and delivery time shall not exceed 90 minutes.
 - 2. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.
 - 1. For mixer capacity of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
 - 2. For mixer capacity larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).
 - 3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

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 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. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
 - 1. Class A, 1/8 inch (3.2 mm) for smooth-formed finished surfaces.
 - 2. Class C, 1/2 inch (13 mm) for rough-formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. 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.
 - 1. Install keyways, reglets, recesses, and the like, for easy removal.
 - 2. Do not use rust-stained steel form-facing material.
- F. 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.
- G. 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.
- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. 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 rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
 - 2. Install reglets to receive 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.

3.3 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, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.
 - 1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
 - 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. 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.
- C. 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 VAPOR RETARDERS

- A. Plastic Vapor Retarders: Convene preconstruction meeting prior to starting work. Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions.
 - 1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.
- B. Bituminous Vapor Retarders: Place, protect, and repair vapor retarders according to manufacturer's written instructions.

3.5 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" and Structural Drawings 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 that would reduce bond to concrete.
- 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.
 - 1. Weld reinforcing bars according to AWS D1.4, where indicated.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire reinforcement 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.

- F. Epoxy-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M. Use epoxy-coated steel wire ties to fasten epoxy-coated steel reinforcement.
- G. Zinc-Coated Reinforcement: Repair cut and damaged zinc coatings with zinc repair material according to ASTM A 780. Use galvanized steel wire ties to fasten zinc-coated steel reinforcement.

3.6 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 Architect.
 - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 - 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) 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 no further than 90' on center. Locate joints midway between piers integral with walls, near corners, and in concealed locations where possible.
 - 6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 - 7. 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. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
 - 3. Slab reinforcement shall not cross contraction 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.

2. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants, specified in Division 07 Section "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

3.7 WATERSTOPS

- A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the 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, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

3.8 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 unless approved by Architect.
- C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Deposit concrete continuously in one layer or in horizontal 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 indicated. Deposit concrete to avoid segregation.
 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- E. 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, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- F. Cold-Weather Placement: Comply with the recommendations and intent of ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301. Deliver concrete to meet the following minimum temperatures immediately after placement:
 - a. 55 deg F for sections less than 12in. in the least dimension.
 - b. 50 deg F for sections 12in. to 36in. in the least dimension.
 - c. 45 deg F for sections 36in. to 72in. in the least dimension.
 - d. 40 deg F for sections greater than 72in. in the least dimension.
 - e. The temperature of concrete as placed shall not exceed these values by more than 20 deg F.
 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- G. Hot-Weather Placement: Comply with ACI 301 and as follows:
1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.9 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
1. Apply to concrete surfaces not exposed to public view.
- 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 defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
1. Apply to concrete surfaces exposed to public view, to receive a rubbed finish, to be covered with a coating or covering material applied directly to concrete.
- C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:
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.
2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
 3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix one part portland cement and one part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.
- 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.

3.10 FINISHING FLOORS AND SLABS

- A. General: Comply with the recommendations and intent of ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch (6 mm) in 1 direction.
1. Apply scratch finish to surfaces indicated by Architect and to receive concrete floor toppings, to receive mortar setting beds for bonded cementitious floor finishes.
- C. 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 restraighening until surface is left with a uniform, smooth, granular texture.
1. Apply float finish to surfaces indicated by Architect to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
- D. Trowel Finish: After applying float finish, apply first troweling 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 by Architect, 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 following tolerances, according to ASTM E 1155 (ASTM E 1155M), for a randomly trafficked floor surface:

- a. Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17; for slabs-on-grade.
 3. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-foot- (3.05-m-) long straightedge resting on 2 high spots and placed anywhere on the surface does not exceed 3/16 inch (4.8 mm).
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated by Architect, where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.
1. Comply with flatness and levelness tolerances for trowel finished floor surfaces.
- F. 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.
- G. Slip-Resistive Finish: Before final floating, apply slip-resistive aggregate or aluminum granule finish where indicated and to concrete stair treads, platforms, and ramps. Apply according to manufacturer's written instructions and as follows:
1. Uniformly spread 25 lb/100 sq. ft. (12 kg/10 sq. m) of dampened slip-resistive aggregate or aluminum granules over surface in 1 or 2 applications. Tamp aggregate flush with surface, but do not force below surface.
 2. After broadcasting and tamping, apply float finish.
 3. After curing, lightly work surface with a steel wire brush or an abrasive stone and water to expose slip-resistive aggregate or aluminum granules.
- H. Dry-Shake Floor Hardener Finish: After initial floating, apply dry-shake floor hardener to surfaces according to manufacturer's written instructions and as follows:
1. Uniformly apply dry-shake floor hardener at a rate of 100 lb/100 sq. ft. (49 kg/10 sq. m) unless greater amount is recommended by manufacturer.
 2. Uniformly distribute approximately two-thirds of dry-shake floor hardener over surface by hand or with mechanical spreader, and embed by power floating. Follow power floating with a second dry-shake floor hardener application, uniformly distributing remainder of material, and embed by power floating.
 3. After final floating, apply a trowel finish. Cure concrete with curing compound recommended by dry-shake floor hardener manufacturer and apply immediately after final finishing.

3.11 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 the Work.

- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.
- D. 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.

3.12 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with the recommendations and intent of ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. 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 for the remainder of the curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, 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 certifies will not interfere with bonding of floor covering used on Project..

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.
 - a. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.
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.

3.13 LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions to concrete floors indicated in Architectural Drawings to be troweled and sealed.
 1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
 2. Do not apply to concrete that is less than seven days' old unless otherwise required by manufacturer.
 3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.
- B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

3.14 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
 1. Defer joint filling until concrete has aged at least one month. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.15 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 (1.18-mm) 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 (13 mm) in any dimension in solid concrete, but not less than 1 inch (25 mm) 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 (0.25 mm) 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 (6 mm) 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 (25 mm) 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 a 3/4-inch (19-mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture 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 (25 mm) 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.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.16 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Testing and Inspecting: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- C. Inspections:
 - 1. Steel reinforcement placement.
 - 2. Steel reinforcement welding.
 - 3. Headed bolts and studs.
 - 4. Verification of use of required design mixture.
 - 5. Concrete placement, including conveying and depositing.
 - 6. Curing procedures and maintenance of curing temperature.
 - 7. Verification of concrete strength before removal of shores and forms from beams and slabs.
- D. Concrete Tests: 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 mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
 - 2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mixture placed each day.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 - 3. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
 - 4. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - 5. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
 - 6. 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 mixture.
 - 7. Compression Test Specimens: ASTM C 31/C 31M.
 - a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.

- b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.
 - 8. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
 - a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days. Compression test specimens for days not specified shall be at the contractor's expense.
 - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
 - 9. 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.
 - 10. Strength of each concrete mixture 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 (3.4 MPa).
 - 11. 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 mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
 - 12. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Structural Engineer of Record but will not be used as sole basis for approval or rejection of concrete.
 - 13. Additional Tests: Testing and inspecting agency shall make additional tests of concrete at the Contractor's expense when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Structural Engineer of Record. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
 - 14. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
 - 15. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
- E. Measure floor and slab flatness and levelness according to ASTM E 1155 (ASTM E 1155M) within 24 hours of finishing.

CONCRETE SUBMITTAL CHECKLIST

This submittal checklist must be provided with all concrete and reinforcing steel packages that are to be submitted to Structural Design Group. Absence of a properly completed checklist may result in the return of the submittal unchecked or as revise and resubmit.

MIX DESIGN		
Included?	Description	Location in project documentation where this requirement is located.
<input type="checkbox"/>	Field data or trial mixture strength data	Spec Section 03300, Part I, Subsection 1.4
<input type="checkbox"/>	Verify Mix Design Constraints Limit Fly Ash to 25% Limit Proportions per Spec Section 03300, Part II, Subsection 2.5 W/C ratio, Air, Slump per General Notes	Spec Section 03300, Part II, Subsection 2.5 General Notes – Section 4.0
<input type="checkbox"/>	Mix Design Data: 1. Proportions of cement, fine and coarse aggregate and water. 2. Water/cement ratio, design strength, slump and air content. 3. Type of cement and aggregates. 4. Type and dosage of all admixtures. 5. Type, color and dosage of integral coloring compounds, where applicable. 6. Special requirements for pumping. 7. Any special characteristics of the mix which require precautions in the mixing, placing or finishing techniques to achieve the finished product specified. 8. Material certifications 1) Cementitious materials. 2) Admixtures. 3) Aggregates .	Spec Section 03300, Part I, Subsection 1.4 Spec Section 03300, Part I, Subsection 2.5, 2.6
REBAR SHOP DRAWINGS		
Included?	Description	Location in project documentation where this requirement is located.
<input type="checkbox"/>	Submit all shop drawings on one reproducible print and two reproductions only.	General Notes - Section 2.0 Spec Section 03300, Part I, Subsection 1.4
<input type="checkbox"/>	Contract documents not used for shop drawing.	Spec Section 03300, Part I, Subsection 1.4
<input type="checkbox"/>	Resubmitted shop drawings have all revised items clouded or identified.	Spec Section 03300, Part I, Subsection 1.4
<input type="checkbox"/>	Any requested information, clarifications, requests for approvals, modifications, etc. as listed in Spec Section 03300, Part I, Subsection 1.4 are included by the contractor below.	Spec Section 03300, Part I, Subsection 1.4

FORMWORK, RE-SHORE, OTHER SHOP DRAWINGS

Included?	Description	Location in project documentation where this requirement is located.
<input type="checkbox"/>	Submit all shop drawings on one reproducible print and two reproductions only.	General Notes - Section 2.0 Spec Section 03300, Part I, Subsection 1.4
<input type="checkbox"/>	Contract documents not used for shop drawing, including erection plans or details	Spec Section 03300, Part I, Subsection 1.4
<input type="checkbox"/>	Resubmitted shop drawings have all revised items clouded or identified.	Spec Section 03300, Part I, Subsection 1.4
<input type="checkbox"/>	Any requested information, clarifications, requests for approvals, modifications, etc. as listed in Spec Section 03300, Part I, Subsection 1.4 are included by the contractor below.	Spec Section 03300, Part I, Subsection 1.4
<input type="checkbox"/>	Calculations stamped by an Engineer registered in the state where the project is located.	Spec Section 03300, Part I, Subsection 1.4

QUESTIONS, ETC. PER SECTION 03300, PART I, SUBSECTION 1.4

END OF SECTION 03300

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 fabrication and erection of structural steel work, as shown on drawings including schedules, notes, and details showing size and location of members, typical connections, and types of steel required.
 - 1. Structural steel is that work defined in American Institute of Steel Construction (AISC) "Code of Standard Practice" and as otherwise shown on drawings.
 - 2. Miscellaneous Metal Fabrications are specified elsewhere in Division 5.
 - 3. Refer to Division 3 for anchor bolt installation in concrete and Division 4 for anchor bolt installation in masonry.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
 - 1. Submit all shop drawings on three copies only unless specified otherwise in the general conditions. Two prints will be returned to the architect. All copies required by the Contractor are the responsibility of the Contractor and shall be made after reproducible is returned.
- B. Product data or manufacturer's specifications and installation instructions for following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards). This data is submitted for information only.
 - 1. Structural steel (each type), including certified copies of mill reports covering chemical and physical properties.
 - 2. High-strength bolts (each type), including nuts and washers.
 - a. Include Direct Tension Indicators if used.
 - 3. Structural steel primer paint.
 - 4. Shrinkage-resistant grout.
- C. Shop drawings including complete details and schedules for fabrication and assembly of structural steel members, procedures, and diagrams.
 - 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 type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
 5. Contract documents shall not be used for shop drawing, including erection plans or details.
 6. All shop drawings which are resubmitted for any reason shall have all revised items clouded or identified for each submittal.
 7. All structural steel connections not specifically detailed on the drawings shall be designed to resist forces indicated, by the Contractor.
 8. 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.
 9. For each connection, the following shall be noted on the shop drawings:
 - a. Required design reaction
 - b. Calculation sheet number for design
 - c. Capacity of detailed connection
 - d. Stamp of Engineer submitting calculations for the connection
 10. All shop drawings which do not provide this information will be returned unchecked as an incomplete submittal.
- D. Test reports conducted on shop- and field-bolted and welded connections. Include data on type(s) of tests conducted and test results.

1.4 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of following, except as otherwise indicated:

1. American Institute of Steel Construction (AISC) "Code of Standard Practice for Steel Buildings and Bridges", dated June 10, 1992.
 - a. General: AISC "Code of Standard Practice" shall apply except to the extent that references are made to the responsibility of the Owner and/or Architect or Engineer in which event those references shall have no applicability. Where a conflict exists between the Code of Standard Practice and the Contract Documents, the Contract Documents shall govern.
2. AISC "Specifications for Structural Steel Buildings," including "Commentary".
3. AISC "Specifications for Structural Steel Buildings, Section 10, Architecturally Exposed Structural Steel".
4. "Specifications for Structural Joints using ASTM A325 or A490 Bolts" approved by the Research Council on Structural Connections.
5. American Welding Society (AWS) D1.1 "Structural Welding Code - Steel."
6. ASTM A6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use."

B. Qualifications for Welding Work: Qualify welding procedures and welding operators in

accordance with AWS "Qualification" requirements.

1. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.
2. If re-certification of welders is required, retesting will be Contractor's responsibility.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site at such intervals to ensure uninterrupted progress of work.
- B. Deliver anchor rods and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not to delay work.
- C. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration. If bolts and nuts become dry or rusty, clean and relubricate before use.
 1. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Metal Surfaces, General: For fabrication of work that will be exposed to view, use only materials that are smooth and free of surface blemishes including pitting, rust and scale seam marks, roller marks, rolled trade names, and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating, and applying surface finishes.
- B. Structural Steel: ASTM A992, Grade 50 for wide flange beams; ASTM A36 elsewhere.
- C. Cold-Formed Steel Tubing: ASTM A500, Grade B.
- D. Hot-Formed Steel Tubing: ASTM A501.
- E. Steel Pipe: ASTM A53, Type E or S, Grade B; or ASTM A501.
- F. Moment Connection Material: Unless noted otherwise on the drawings, stiffener plates, doubler plates, gusset plates and the connecting plates shall be the same grade of steel as members being connected.
- G. Headed Stud-Type Shear Connectors: ASTM A108, Grade 1015 or 1020, cold-finished carbon steel with dimensions complying with AISC Specifications.
- H. Anchor Rods: ASTM A307 Grade A, headed type with supplementary requirements S1, unless otherwise indicated.
- I. Unfinished Threaded Fasteners: ASTM A307, Grade A, regular low-carbon steel bolts and nuts.
 1. Provide either hexagonal or square heads and nuts, except use only hexagonal units for exposed connections.
- J. High-Strength Threaded Fasteners: Heavy hexagon structural bolts, heavy hexagon nuts, and

hardened washers, as follows:

1. Quenched and tempered medium-carbon steel bolts, nuts, and washers, complying with ASTM A325.
 - a. Where indicated as galvanized, provide units that are zinc coated, either mechanically deposited complying with ASTM B695, Class 50, or hot-dip galvanized complying with ASTM A153.
 2. Quenched and tempered alloy steel bolts, nuts, and washers, complying with ASTM A490.
- K. Electrodes for Welding: Comply with AWS Code.
- L. Structural Steel Primer Paint: Red oxide primer.
- M. Cement Grout: Portland cement (ASTM C150, Type I or Type III) and clean, uniformly graded, natural sand (ASTM C404, Size No. 2). Mix at a ratio of 1.0 part cement to 3.0 parts sand, by volume, with minimum water required for placement and hydration.
- N. Nonmetallic Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining product containing selected silica sands, Portland cement, shrinkage compensating agents, plasticizing and water-reducing agents, complying with CE-CRD-C621.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
 - a. 100 Non-Shrink Grout (Non-Metallic); Conspec, Inc.
 - b. Supreme Grout; Cormix, Inc.
 - c. Sure Grip Grout; Dayton Superior.
 - d. Euco N.S.; Euclid Chemical Co.
 - e. Crystex; L & M Construction Chemicals, Inc.
 - f. Masterflow 713; Master Builders.
 - g. Sealtight 588 Grout; W. R. Meadows.
 - h. Propak; Protex Industries, Inc.
 - i. Set Non-Shrink; Set Products, Inc.
 - j. Five Star Grout; U.S. Grout Corp.

2.2 FABRICATION

- A. Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings. Provide camber in structural members where indicated.
1. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence that will expedite erection and minimize field handling of materials.
 2. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.
- B. Connections: Weld or bolt shop connections, as indicated.
1. Bolt field connections, except where welded connections or other connections are indicated.
 - a. Provide high-strength threaded fasteners for all principal bolted connections, except where unfinished bolts are indicated.

- C. Simple Beam Connections: Standard double angle framed beam connections using bolts as specified.
 - 1. Seated Beam Connections and Stiffened Seated Beam Connections shall not be used unless indicated on the drawings or unless Engineer approval is obtained to verify capacity of supporting member for the resulting eccentricity. The fabricator must verify and bear responsibility that the use of such connections does not interfere with Architectural or MEP requirements.
- D. High-Strength Bolted Construction: Install high-strength threaded fasteners in accordance with AISC "Specifications for Structural Joints using ASTM A325 or A490 Bolts."
- E. Welded Construction: Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work.
- F. Steel Wall Framing: Select members that are true and straight for fabrication of steel wall framing. Straighten as required to provide uniform, square, and true members in completed wall framing.
- G. Holes for Other Work: Provide holes required for securing other work to structural steel framing and for passage of other work through steel framing members, as shown on final shop drawings.
- H. Provide threaded nuts welded to framing and other specialty items as indicated to receive other work.
- I. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame-cut holes or enlarge holes by burning. Drill holes in bearing plates.

2.3 SHOP PAINTING

- A. General: Shop-paint structural steel, except those members or portions of members to be embedded in concrete or mortar. Paint embedded steel that is partially exposed on exposed portions and initial 2 inches of embedded areas only.
 - 1. Do not paint surfaces to be welded or high-strength bolted with slip-critical-type connections.
 - 2. Do not paint surfaces scheduled to receive sprayed-on fireproofing.
 - 3. Apply 2 coats of paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.
- B. Painting: Provide a one-coat, shop-applied paint system complying with Steel Structures Painting Council (SSPC) Paint System Guide No. 7.00.
- C. Painting of steel exposed to weathering in the finished configuration of the structure:
 - 1. Surface Preparation: Clean surfaces to be painted. Remove rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning.
 - 2. Prime Coat: Immediately after surface preparation, provide one coat of grey shop applied Organic Zinc Rich Urethane Primer, such as Thnemec 90-97, at 2.5 to 3.5 mils DFT which meets the following performance requirements:
 - a. Solids by Volume: 63%

- b. Zinc Content: 83% by weight.
 - c. Salt Spray (Fog): ASTM B 117, Scribed Panels, 50,000 hours exposure.
 - d. Adhesion: ASTM 4541 – Type V – no less than 2,083 psi(14.36 MPa) pull.
 - e. Prohesion: ASTM G85 Prohesion Cabinet Testing. 15,000 hours.
 - f. Cathodic Disbondment: ASTM G8, Method A.
 - g. Immersion: ASTM D 870 Potable Water Immersion. 7 year exposure.
 - h. AISC Static Fatigue: Primer shall meet requirements of a Class B surface with a mean slip coefficient no less than 0.50 and a tension creep not in excess of .005 inch over SSPC-SP6 prepared substrate.
3. Touch Up Primer/Preparation before Finish Coats: Immediately after erection all surfaces shall be cleaned per SSPC – SP1 followed by spot repair preparation of SSPC-SP11 Power tool clean to white metal. Remove all foreign materials and contaminants, clean field welds, bolted connections, and abraded areas of shop paint. All damaged and abraded areas shall have feathered edges. Field touch-up with one coat of Prime Coat, paint applied at 2.5-3.5 Mils DFT prior to finish coat.
4. Intermediate Coat: Provide one grey finish coat of an Aliphatic Acrylic Polyurethane, such as Tnemec Series 1075 Endura-Shield II, at 3.0 to 5.0 mils DFT which meets the following performance requirements:
- a. Solids by Volume: 71%
 - b. Salt Spray (Fog): ASTM B 117, 2,000 hours exposure.
 - c. Abrasion: ASTM 4060 (CS-17 Wheel, 1,000 gram load, 1,000 cycles). No more than 139 mg loss.
 - d. Adhesion: ASTM 4541 – no less than 1,423 psi(9.81 MPa) pull.
 - e. Flexibility: ASTM D 522 (Method A) – no less than 14.4% elongation.
 - f. Hardness: ASTM 3363- no gouging with an HB or less pencil.
 - g. Humidity: ASTM 4585- 4,000 hours exposure.
 - h. Impact: ASTM B 2794 – no cracking or delamination of film after 35 inch-pounds direct impact.
 - i. Prohesion: ASTM G85 – 10,000 hours exposure.
5. Finish Coat: Provide one finish coat (color to be selected by architect) of an Advanced Thermoset Solution Fluoropolymer, such as Tnemec Series 1070 Fluoronar, at 2.0 to 3.0 mils DFT which meets the following performance requirements:
- a. Solids by Volume: 60%
 - b. Salt Spray (Fog): ASTM B 117 – 10,000 hours exposure
 - c. Abrasion: ASTM 4060 – (CS-17 Wheel, 1,000 gram load, 1,000 cycles) no more than 103 mg loss.
 - d. Adhesion: ASTM 4541 – Type V – no less than 1,930 psi(13.3 MPa) pull.
 - e. Flexibility: ASTM D 522 (Method A)- no less than 14.83% elongation.
 - f. Hardness: ASTM 3363 – no gouging with an 8H or less pencil.
 - g. Humidity: ASTM 4585 – 3,000 hours exposure.
 - h. Impact: ASTM B 2794 - no cracking or delamination of film after 35 inch-pounds direct impact.
6. Any Field Painting to be brush or roller applied.
7. Owners testing agent to continuously review the surface preparation and application of the painting of steel exposed to weathering in the finished configuration of the structure.

2.4 SOURCE QUALITY CONTROL

- A. General: Materials and fabrication procedures are subject to inspection and tests in mill, shop, and field, conducted by a qualified inspection agency. Such inspections and tests will not relieve Contractor of responsibility for providing materials and fabrication procedures in compliance with

specified requirements.

1. Promptly remove and replace materials or fabricated components that do not comply.
- B. Design of Members and Connections: Details shown are typical; similar details apply to similar conditions, unless otherwise indicated. Verify dimensions at site whenever possible without causing delay in the work.
1. Promptly notify Architect whenever design of members and connections for any portion of structure are not clearly indicated.

PART 3 - EXECUTION

3.1 ERECTION

- A. Surveys: Employ a licensed land surveyor for accurate erection of structural steel. Check elevations of concrete and masonry bearing surfaces, and locations of anchor bolts and similar devices, before erection work proceeds, and report discrepancies to Architect. Do not proceed with erection until corrections have been made or until compensating adjustments to structural steel work have been agreed upon with Architect.
- B. Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds.
- C. Temporary Planking: Provide temporary planking and working platforms as necessary to effectively complete work.
- D. Setting Bases and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of base and bearing plates.
1. Set loose and attached base plates and bearing plates for structural members on wedges or other adjusting devices.
 2. 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 prior to packing with grout.
 3. Pack grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure.
 4. For proprietary grout materials, comply with manufacturer's instructions.
- E. Field Assembly: Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces that will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
- F. Level and plumb individual members of structure within specified AISC tolerances.
- G. Establish required leveling and plumbing measurements on mean operating temperature of structure. Make allowances for difference between temperature at time of erection and mean

temperature at which structure will be when completed and in service.

- H. Splice members only where indicated and accepted on shop drawings.
- I. Erection Bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds, and grind smooth at exposed surfaces. Each erection bolt on shop drawings shall be noted "Erection Bolt".
 - 1. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
 - 2. Do not enlarge unfair holes in members by burning or by using drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.
- J. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in primary structural framing. Cutting will be permitted only on secondary members that are not under stress, as acceptable to Architect. Finish gas-cut sections equal to a sheared appearance when permitted.
- K. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting.
 - 1. Apply by brush or spray to provide minimum dry film thickness of 1.5 mils.

3.2 QUALITY CONTROL

- A. Owner will engage an independent testing and inspection agency to inspect high-strength bolted connections and welded connections and to perform tests and prepare test reports.
- B. Testing agency shall conduct and interpret tests, state in each report whether test specimens comply with requirements, and specifically state any deviations therefrom.
- C. Provide access for testing agency to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.
- D. Testing agency may inspect structural steel at plant before shipment.
- E. Correct deficiencies in structural steel work that inspections and laboratory test reports have indicated to be not in compliance with requirements. Perform additional tests, at Contractor's expense, as necessary to reconfirm any noncompliance of original work and to show compliance of corrected work.
- F. Field Inspections and Tests:
 - 1. Check steel as received in the field for possible shipping damage workmanship, piece making and verification of required camber.
- G. Shop-Bolted Connections:
 - 1. Inspect or test in accordance with AISC specifications.
 - 2. For bolted connections (bearing-type), all connections shall be visually observed to assure that all bolts, nuts and washers are in place and that all plies of connection material have been drawn together. All bolts shall be verified to be snug tight only.
- H. Shop Welding: Inspect and test during fabrication of structural steel assemblies, as follows:

1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
 2. Perform visual inspection of all welds, including but not limited to fit-up, intermediate passes and final weld.
 3. Perform tests of welds as follows. Inspection procedures listed
 - a. Ultrasonic Inspection: ASTM E164. Perform on all full and partial penetration welds.
- I. Field-Bolted Connections:
1. Inspect in accordance with AISC specifications.
 2. For bolted connections (bearing-type), all connections shall be visually observed to assure that all bolts, nuts and washers are in place and that all plies of connection material have been drawn together. All bolts shall be verified to be snug tight only.
 3. Bolts in slotted holes at expansion joints shall have nuts finger tight with threads damaged.
- J. Field Welding: Inspect and test during erection of structural steel as follows:
1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
 2. Perform visual inspection of all welds, including but not limited to fit-up, intermediate passes and final weld.
 3. Perform tests of welds as follows:
 - a. Ultrasonic Inspection: ASTM E164. Perform on all full and partial penetration welds.

END OF SECTION 05120.

1.0 - GENERAL

- 1.1 Scope
Furnish and install all miscellaneous metals as indicated on drawings, including that shown only on Architectural Drawings, and/or as specified.
- 1.2 Submittals
Submit shop drawings for approvals.
- 1.3 Applicable Standards
Fabrication and erection, except as specified otherwise, shall be in accordance with American Institute of Steel Construction (AISC) Specifications for the Design, Fabrication and Erection of Structural Steel for Building.
- 1.4 Qualification
Manufacturer's names, models, or catalog numbers, referred to herein are intended to show the type, quality and intent of items required. Products of other manufacturers equal or better in quality, similar in design are acceptable subject to the Architect's approval.
- 1.5 Substitutions
Substitutions of sections or modifications of details shall be submitted with the shop drawings for approval. Approved substitutions, modifications, and necessary changes in related portions of the work shall be coordinated by the contractor and shall be accomplished at no additional cost.

2.0 - PRODUCTS

- 2.1 General Materials
 - A. Metals shall be free from defects impairing strength, durability, or appearance and of the best commercial quality for the purposes specified. All materials shall be new materials and shall have structural properties to sustain safely or withstand strains or stresses to which normally subjected. All exposed fastenings shall be of same material, color and finish as the metal to which applied unless otherwise shown.
 - B. Provide all accessories such as anchors, hangers, belts, toggle bolts, expansion bolts, rods, shelf angles, clip angles, shims, connections, stiffeners, reinforcements, screws, etc., required for proper complete fabrication, assembly and installation of all miscellaneous steel, metal work and masonry. Bolts, screws, expansion bolts, toggle bolts, etc, shall be brass, bronze, stainless steel or aluminum when used with these metals.
 - C. Steel lintels and miscellaneous structural shapes where called for shall be of shapes, lengths and weights, as shown and detailed on the drawings, spanning openings where so indicated, shall be complete with bolts, anchors, etc., for building in. Lintels shall not have less than eight (8") inch bearing upon masonry.
 - D. Galvanized steel shall be hot-dipped galvanized in accordance with the Standard Specifications of the American Hot-Dip Galvanizing Association. Galvanizing shall be done after fabrication.
 - E. All materials shall be well formed to shape and size with sharp lines. Conceal fasteners where practical. Thickness of metals and details of assembly and

supports shall give ample strength.

- F. Welding shall conform to American Welding Society's Standard Code for Arc and Gas Welding in Building Construction. Welding shall be continuous along entire area of contact, except where tack welding is specifically shown or specified. Tack welding will not be permitted on exposed surface. Grind all exposed welds smooth.

2.2 Painting and Protective Coating

- A. Thoroughly clean off all miscellaneous metal, using power tool cleaning to remove all dirt, grease, rust, and scale and foreign matter.
- B. Treat only concealed galvanized metal with galvanized metal primer as per manufacturer's directions before painting. Exposed galvanized metal to be primed and finished under Painting Section.
- C. Unless otherwise specified, paint all metal items, including concealed galvanized metal, one shop coat of Red or Grey oxide zinc chromate TT-P-636-C. Surfaces inaccessible after assembly shall be painted before assembly. Work paint thoroughly into joints, etc. Do not paint bronze, aluminum or stainless steel.
- D. Insulate faces of all metals in contact with different metals, wood, masonry, and/or concrete; give each contact surface one coat approved alkali-resistant bituminous paint. Let both surfaces dry before installing metals.

2.3 Miscellaneous Metal Items

The following items are intended as a guide to such work in this project and do not necessarily limit the scope of this section.

- A. All structural shapes indicated and/or required.
- B. Miscellaneous Steel Lintels. Provide miscellaneous steel lintels indicated on Architectural and/or Structural Drawings or as required. All miscellaneous steel lintels are subject to structural engineer's review and approval.
- C. Interior and Exterior Round Member Stair And Ramp Handrail, Guardrails and Brackets as indicated and detailed. Handrail to be 3 ft. min. Wood handrail under CARPENTRY - SECTION - 06210.
- D. Protective Bollards shall be steel pipe with prefabricated stock cap 6" diameter 7' steel painted pipe bollards filled with concrete set 3'-6" deep in 15" diameter concrete footing. Bollards shall be placed 3'-6" from connection and spaced around the perimeter at 48" o.c. max.

3.0 – EXECUTION

3.1 Fabrication

- A. Verify measurements in field for work fabricated to fit job conditions.
- B. Fabricate form work true to detail with clean, straight, sharply defined profiles. Iron shall have smooth finished surfaces unless indicated otherwise. Shearing and punching shall leave clean, true lines and surfaces.
- C. Fastenings shall be concealed where practical. Thickness of metal and details of assembly and supports shall give ample strength and stiffness. Joints exposed to the weather shall be formed to exclude water. Provide holes and connections for

the work of other trades.

- D. Joints shall be rigid at adjoining sections for a strong assembly. Weld or rivet permanent connections. Welds shall be continuous and finished flush and smooth on surfaces that will be exposed after installation. Do not use screws or bolts where it can be avoided; where screws or bolts are used, the heads shall be countersunk, screwed up tight and threads nicked to prevent loosening. Unexposed welded joints may be continuous, or spot welded as required. Remove weld spatter from adjacent surfaces.

3.2 Installation

- A. Erect work in thorough, first-class manner with mechanics experienced in the erection of iron work.
- B. Work shall be strong, secure, and adequate for the purpose intended.
- C. Schedule delivery of items to be built into the masonry so as not to delay the progress of the work and to coordinate for proper installation.
- D. Place and properly secure to form work items such as anchors, sleeves, and inserts which are to be cast in concrete.

END OF SECTION

1.0 - GENERAL

1.1 Scope

The work under this section consists of all rough carpentry work.

1.2 General

- A. Rough carpentry shall generally include all rough framing, furring, grounds, bucks, blocking and such other wood work as required.
- B. Carpentry shall also include all temporary bracing, shoring and centering as required for the support or protection of the work.

1.3 Cooperation With Other Trades

The work under this section includes the necessary cutting and patching required for the proper installation of work of other trades. Work which is to be built in by others shall be accurately positioned and properly built in to secure the work of this section. Temporary centering, bracing and shoring shall be provided as required for the support and protection of masonry work during construction.

1.4 Delivery and Storage

Lumber and other materials specified herein shall be delivered, handled and stored in order to prevent damage and absorption of excess moisture. Lumber shall be stored in such a manner as to insure proper ventilation and protection from the weather.

2.0 - PRODUCTS

2.1 Lumber

- A. All dimensional lumber used under this section shall be thoroughly dried No. 2 Southern Yellow Pine or No. 2 Douglas Fir of sizes, shapes and lengths required. Moisture content shall not exceed 19% at time of installation.
- B. All wood shall be sound, flat, straight, well-seasoned, thoroughly dry and free from structural defects. Warped or twisted wood shall not be used.
- C. Lumber grades shall conform to the grading rules of the manufacturer's association under whose rules the lumber is produced. All lumber shall be grade-marked.

2.2 Plywood

- A. Each panel of softwood plywood shall be identified with the DFPA grade trademark of the American Plywood Association and shall meet the requirements of Product Standard PS 1-66 for Softwood Plywood Construction and Industrial. All plywood which has any edge or surface permanently exposed to the weather shall be of the exterior type.
- B. Plywood sheathing and/or decking shall be DFPA Standard with exterior glue, thickness as shown on the drawings or required for the intended use. Square edge or tongue and groove as approved.
- C. Plywood for roof decking shall be 3/4" minimum CDX with C grade up. Provide "H" clips at mid-span of edge joints.

2.3 Oriented Strand Board (OSB)

- A. Shall be used for floor, wall and roof sheathing in light commercial construction applications as indicated. Each panel is third-party certified

for quality and is rated for Exposure 1 bond durability for protected applications and limited exposure during normal construction delays. OSB shall be edge coated to limit absorption and pick-up of moisture. OSB shall be equal to Georgia-Pacific Blue-Ribbon OSB.

2.4 Wood Treatment

- A. Lumber in contact with concrete or masonry, including roof blocking, cants and nailers and/or as indicated, shall be pressure preservative treated in accordance with American Wood Preservers Institute Standard No. LP-2. Creosote, oil or similar materials which bleed shall not be used.
- B. Lumber for blocking and furring, located within interior concealed spaces shall be non-combustible. Treatment shall be equal to "Flame-Proof" by Osmose Wood Preservative; "Non-Con" by Koppers or approved equal. Lumber shall be UL certification marked.
- C. Pressure Treated wood associated with roof and roof edge construction which will be in contact with steel or galvanized steel components shall be wrapped or covered with Ice & Water Shield to prevent direct contact between pressure treated wood and steel.

2.5 Fastening Devices

Nails, screws, bolts, anchors, washers, clips, shields, power actuated devices and other rough hardware shall be of the sizes and types indicated on the drawings or as required to adequately anchor all members. Anchors for nailing strips and blocking shall have nuts and washers countersunk and bolts cut off flush with the top of the wood nailer. All fasteners in contact with pressured treated wood shall be galvanized.

2.6 Temporary Closures

Provide batten doors with locks at all exterior openings. Appropriate protection against weather and life safety shall be maintained throughout the job.

2.7 Blocking

Provide solid blocking at all grab bars, millwork cabinets and wall mounted units. Coordinate with Installer and/or Manufacturer.

2.8 Building Wrap - Provide building wrap over exterior surface of all exterior walls as recommended by manufacturer. Building Wrap shall be approved equal to Tyvek.

2.9 Air /Moisture Barrier - Provide building wrap over exterior surface of all exterior walls as recommended by manufacturer. Basis of Design: Spunbonded polyolefin, non-woven, non-perforated, weather barrier is based upon Dupont Tyvek Commercial Wrap and related assembly components.

3.0 - EXECUTION

3.1 Installation

- A. All work shall be installed plumb and true, and secured in place with proper fastenings so as to make rigid and firm.
- B. The work of this section shall be performed in the best practice relating to the trade so as to carry out the intent of the drawings and to properly accommodate the work of all trades.
- C. Cut ends or faces of all treated wood shall be brushed treated with preservative.
- D. Wood Studs shall not exceed 16" o.c. Provide stud framing for walls to receive

ceramic tile at 12" o.c.

- E. Plywood Roof Decking shall be installed with a 1/8" expansion gap between abutting sheets, all sides.
- F. All Roof Deck fasteners shall be 100% within roof framing. Nails missing or bypassing structural rafter members shall be subject to correction.

END OF SECTION

PRE-ENGINEERED METAL BUILDING INSULATION - SECTION 07213

1.0 - GENERAL

1.1 Section Includes

- A. Pre-Engineered Building Insulation for New Construction.

1.2 Related Sections

- A. Section 13100 - Pre-Engineered Metal Building System.
- B. Division 15 - Fire Protection Systems.
- C. Division 15 - Mechanical; Rough-in utilities.
- D. Division 16 - Electrical; Rough-in utilities.

1.3 References

- A. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. ASTM E 96 - Standard Test Method for Water Vapor Transmission of Materials in Sheet Form (Procedure B).
- C. ASTM C 665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- D. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- E. UL 723 - Tests for Surface Burning Characteristics of Building Materials.
- F. ASTM C 1136 - Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation.

1.4 Design Requirements

- A. Thermal Resistance of Installed System: R-Value as indicated on drawings.
- B. Insulating system shall have a continuous vapor barrier inside of building purlins, girts, and insulation to provide complete isolation from inside conditioned air.

1.5 Submittals

- A. Submit under provisions of Section 01350.
- B. Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation instructions.

- C. Shop Drawings: Indicate locations of connections and attachments, general details, anchorages and method of anchorage and installation.
- D. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square or long, representing actual products required for this project.
- E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.6 Quality Assurance

- A. Manufacturer Qualifications: Company specializing in manufacturing product systems specified in this section with minimum five years documented experience.
- B. Installer Qualifications: Company specializing in performing work of this section.
- C. Insulation system components to include a ten-year limited material warranty.
- D. Wet Insulation shall be rejected and replacement shall be required.

1.7 Delivery, Storage, And Handling

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store products indoors and protect from moisture, construction traffic, and damage.

1.8 Project Conditions

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

2.0 - PRODUCTS

2.1 Manufacturers

- A. Acceptable Manufacturer: Thermal Design, Inc., Simple Saver System. Basis of Design.
- B. Requests for substitutions will be considered in accordance with provisions of Section 01360 and must be submitted to Architect at least 10 days prior to Bid. Pre-Approved manufacturers shall be notified in writing via Addendum.

2.2 Materials

- A. Simple Saver System consists of Batt Insulation, Roof Insulation, Wall

Insulation, Vapor Barrier Liner Fabric, Thermal Breaks, Straps, and other devices and components in an insulation system as follows:

1. Batt Insulation: ASTM C 991 Type 1; preformed formaldehyde-free glass fiber batt conforming to the following:
 - a. Thermal Resistance: As indicated on drawings.
 - b. Batt Size: Equal to purlin/girt spacing by manufacturer's standard lengths.
 - c. Unfaced.
2. Roof Insulation: Formaldehyde-free fiberglass batt or fiberglass blanket complying with ASTM C 991 Type 1 and ASTM E 84 with a thermal resistance and thickness as follows:
 - a. As indicated on the drawings.
3. Wall Insulation: Formaldehyde-free fiberglass blanket or batt complying with ASTM C 991 Type 1, ASTM E 136 and ASTM E 84 with a thermal resistance and thickness as follows:
 - a. As indicated on the drawings.
4. Vapor Barrier Liner Fabric: Syseal® type woven, reinforced, high-density polyethylene yarns coated on both sides with a continuous white or colored polyethylene coatings, as follows:
 - a. Product complies with ASTM C 1136, Types I through Type VI.
 - b. Perm rating: 0.02 for fabric and for seams in accordance with ASTM E 96.
 - c. Flame/Smoke Properties:
 - 1) 25/50 in accordance with ASTM E 84.
 - 2) Self-extinguishes with field test using matches or butane lighter.
 - d. Ultra violet radiation inhibitor to minimum UVMAX® rating of 8.
 - e. Size and seaming: Manufactured in large custom pieces by extrusion welding from roll goods, and fabricated to substantially fit defined building area with minimum practicable job site sealing.
 - f. Provide with factory triple, extrusion welded seams. Stapled seams or heat-melted seams are not acceptable due to degradation of fabric.
 - g. Factory-folded to allow for rapid installation.
 - h. Color: White
5. Vapor Barrier Lap Sealant: Solvent-based, Simple Saver polyethylene fabric sealant
6. Vapor Barrier Tape: Double-sided sealant tape 3/4 inch (19 mm) wide by 1/32 inch (.79 mm) thick.
7. Vapor Barrier Patch Tape: Single-sided, adhesive backed sealant tape 3 inches (76 mm) wide made from same material as Syseal® type liner fabric.
8. Thermal Breaks:
 - a. 3/16 inch (4.7 mm) thick by 3 inch (76 mm) wide white, closed-cell polyethylene foam with pre-applied adhesive film and peel-off backing.
 - b. Polystyrene Snap-R snap-on thermal blocks.
9. Straps:
 - a. 100 KSI minimum yield tempered, high-tensile-strength steel.
 - b. Size: Not less than 0.020 inch (0.50 mm) thick by 1 inch (25 mm) by continuous length.

- c. Galvanized, primed, and painted to match specified finish color on the exposed side.
- d. Color: White.
- 10. Fasteners:
 - a. For light gage steel: #12 by 3/4 (19 mm) inch plated Tek 2 type screws with sealing washer, painted white to match standard color.
 - b. For heavy gage steel: #12 by 1-1/2 inch (38 mm) plated Tek 4 type screws with sealing washer, painted white to match standard color.
- 11. Wall Insulation Hangers: Fast-R preformed rigid hangers, 32 inch (813 mm) long galvanized steel strips with barbed arrows every 8 inches (203 mm) along its length.

3.0 EXECUTION

3.1 Examination

- A. Verify that building structure including all bracing and any concealed building systems are completed and approved prior to installing liner system and insulation in the structure.
- B. Correct any unsatisfactory conditions before proceeding.
- C. If conditions are the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 Installation - General

- A. Install pre-engineered building insulation system in accordance with manufacturer's installation instructions and the approved shop drawings.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Install in exterior spaces without gaps or voids. Do not compress insulation.
- D. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- E. Fit insulation tight in spaces and tight to exterior side of the sealed liner fabric and around mechanical and electrical services within plane of insulation.

3.3 Roof Insulation Installation

- A. Straps:
 - 1. Cut straps to length and install in the pattern and spacings indicated on shop drawings.
 - 2. Tension straps to required value.
- B. Vapor Barrier Fabric:
 - 1. Install vapor barrier fabric in large one-piece custom fabricated

pieces to substantially fit defined building areas with minimum practicable job site sealing.

2. Position pre-folded fabric on the strap platform along one eave purlin.
3. Clamp the two bottom corners at the eave and also centered on the bay.
4. Pull the other end of the pleat-folded fabric across the building width on the strap platform, pausing only at the ridge to fasten the straps and fabric in position where plane of roof changes and to release temporary fasteners on the opposite ridge purlins.
5. Once positioned, install fasteners from the bottom side at each strap/purlins intersection.
6. Trim edges and seal along the rafters.
7. All seams must be completely sealed and stapled seams not acceptable.

C. Insulation:

1. Unpack, and shake to a thickness exceeding the specified thickness.
2. Ensure that cavities are filled completely with insulation.
3. Place on the vapor barrier liner fabric without voids or gaps.
4. Place thermal block on top of purlins or bottom of purlins for retrofit work, if no other thermal break exists.
5. Place new insulation between purlins at the required thickness for the R-value specified.

D. Seal vapor barrier fabric to the wall fabric and elsewhere as required to provide a continuous vapor barrier.

3.4 Wall Insulation Installation

A. Insulation:

1. Provide self-sticking foam thermal break to interior surface of girts prior to installation of insulation.
2. Position and secure Fast-R hangers to girts on the inside face of the wall sheathing.
3. Cut insulation to required lengths to fit vertically between girts.
4. Fluff the insulation to the full-specified thickness.
5. Neatly position in place and secure to Fast-R hangers.
6. Ensure that cavities are filled completely with insulation.

B. Vapor Barrier Fabric:

1. Provide vapor barrier fabric in large one-piece custom fabricated pieces to substantially fit defined building areas with minimum practicable job site sealing.
2. Apply the vapor barrier fabric by clamping it in position over eave strap and installing fasteners through the eave strap into each roof strap, permanently clamping the wall fabric between them.
3. Once in position, draw the vapor barrier fabric down over the column flanges to the base angle and install vertical straps along each column and 5 feet 0 inches on center, maximum, fastening to each girt to retain system permanently in place.
4. All seams must be completely sealed and stapled seams not

acceptable.

- C. Seal wall fabric to the roof fabric, to the base angle and up the columns to provide a continuous vapor barrier.

3.5 Cleaning

- A. Clean dirt or exposed sealant from the exposed vapor barrier fabric.
- B. Remove scraps and debris from the site.

3.6 Protection

- A. Protect system products until completion of installation.
- B. Repair or replace damaged products before completion of insulation system installation.

END OF SECTION

SHEET METAL WORK FLASHING AND TRIM - SECTION 07621
(Baked Enamel Steel)

1.0 - GENERAL

1.1 Scope

The work under this section consists of all sheet metal work, including metal flashing, trim and roof drainage accessories.

1.2 Applicable Standards / Quality Assurance

- A. The workmanship and methods employed for forming, anchoring, joining, and measures for expansion and contraction of sheet metal work shall conform to the applicable details and standards as indicated in the "Architectural Sheet Metal Manual, 6th Addition" as published by the Sheet Metal and Air Conditioning Contractors National Association, Inc. and referred to as "The SMACNA Manual," unless other methods are indicated on the project drawings or specified herein.
- B. See Division 1 for required Pre-Roofing Conference.
- C. Prior to fabrication, verify field conditions and coordinate the work if this section with trades of adjoining work as required to provide a complete weathertight system consistent with roofing manufacturer's warranty requirements. The work of this section is subject to acceptance by the Roofing Material Manufacturer and Roofing Contractor. Verify the substrate to be sound, dry, properly sloped, clean, and secure prior to installation of sheet metal work.
- D. Workmanship shall be of best quality. Shop fabricate sheet metal components whenever possible without tool marks and oil-canning. The various sections shall be uniform and have true lines. The joints at corners, angles and different sections shall be accurately fitted and rigidly secured. Exposed edges are to be folded back, joints are to be flat lock seamed and soldered, expansion is to be provided for in long run work. Provide materials of this section and installation to promote longevity and prevent water infiltration.
- E. Galvanic action shall be prevented where two different metals are joined together. Use bitumastic coating or other approved method.
- F. Sheet Metal and Flashing / Trim shall be provided in thickness or weight to withstand wind loads according to zone (but in no case less than 90 MPH winds), thermal movement and building movement as required to avoid compromise of quality. Roof edge flashing components shall meet or exceed recommendations of FMG Loss Prevention Data Sheet 1-49.
- G. Comply with the following material and finish standards: ASTM D 2244-68, ASTM D 659-74, ASTM A 653/A 653M, ASTM A 755/A 755M, ASTM A 792/A 792M, ASTM C 1311 and ASTM D 4586

1.3 Related Documents

Drawings and Division 1 of the Specifications

1.4 Handling and Storage

Sheet metal items shall be carefully handled to prevent damage and shall be stored above the ground in a covered dry location. Damaged items that cannot be restored to a like new condition will be rejected and shall be replaced. Materials shall not be stored on the roof.

1.5 Verifying Dimensions

The contractor shall verify governing dimensions at the building and examine adjoining work on which sheet metal is dependent for installation according to the intent of this specification.

1.6 Examination of Surfaces

The contractor shall examine all surfaces to be covered with sheet metal, shall report any defective surfaces to the architect, and shall not begin work until the defective surfaces have been corrected.

1.7 Submittals and Samples

- A. Submit product data, color charts and samples with intended factory finish and profiles of each product as detailed in SECTION 01350.
- B. Submit Shop Drawings with plan layouts, elevations and enlarged construction details of each applicable roof condition, identified and shown with dimensions, profiles and relationship to adjoining components and materials. Indicate the following as applicable: gauge, weight, thickness, fastening, joining, support, anchoring, expansion measures, etc.

2.0 - PRODUCTS

2.1 Sheet Metal Materials

- A. Zinc-Coated (Galvanized) Steel Sheet -G90 (Z275) coated, structural quality. (minimum 24 ga.)
- B. Factory Finished Baked Enamel Aluminum-Zinc-Coated (Galvalume) Steel Sheet, Class AZ50 coating designation Grade 40, Class AZM150 coating designation Grade 275.
 - 1. Material shall be minimum 24 ga. approved equal to "MBCI Batten-Lock", "AMS Lock-Seam" or "AEP-SPAN Span-Lock" with factory sealant and striations.
 - 2. Factory finish shall be approved equal to KYNAR 500. Color to be selected by the Architect through the submittal process.

2.2 Underlayment

Cold applied, self-adhering elastomeric sheet 30 mils minimum thickness with releasable paper backing. Install as per manufacturer's recommendations.

2.3 Sealing Materials

- A. Sealant shall be elastomeric polyurethane polymer as recommended by manufacturer for use with the work of this section for a finished weathertight installation.
- B. Elastic Sealing Tape with releasable paper backing shall be provided as recommended by manufacture for use with the work of this section for a permanent weathertight installation.
- C. Asphalt Roofing Cement shall be asbestos free and comply with ASTM D 4586 and used only as recommended by manufacture for use with the work of this section for a finished weathertight installation.
- D. Butyl Sealant shall comply with ASTM C 1311 and used only as recommended by manufacture for use with the work of this section for a finished weathertight

installation.

- E. Bituminous Asphalt Mastic, cold applied, shall be asbestos free and used only as recommended by manufacture for use with the work of this section for a finished weathertight installation.

2.4 Fastening

- A. Unless indicated otherwise, fastening system shall be concealed with cleats for expansion / contraction abilities, at exposed visible finished flashing and trim.
- B. Nails, self-tapping screws, bolts, rivets, and other fastenings for sheet metal shall be of the size and type suitable for the intended use. Exposed fasteners shall match contacted sheet metal finish.

2.5 Sheet Metal Work - Roof Drainage Accessories and Fabricated Components

- A. Gravel guards, high and low; Counter Flashing; Flashing Receivers; Eave and Rake Flashing and Equipment Support Flashing as indicated and/or required shall be fabricated from prefinished 24-gauge sheet metal material.
- B. Fascias and/or Coping to shape indicated and/or required. shall be fabricated from prefinished 24-gauge sheet metal material and attach continuously with 20 gauge concealed cleats.
- C. Gutters shall be fabricated per sectional profile as indicated with factory pre-finished sheet metal material of thickness as necessary to structurally support weight of rain water loading according to manufactures calculation charts; but in no case less than 24 gauge. Gutter shall be provided in maximum lengths, not less than 8'-0" . Support gutter with 1 1/4" wide x 16 gauge straps of matching material at 30" max. o.c. Provide the following fabricated gutter accessories as required: sealed outlet tubes, ends, expansion joint covers, etc. of matching material. Gutter Expansion Joints shall be provided 50'-0" o.c. maximum.
- D. Downspouts, shall be fabricated rectangular in sectional profile with factory pre-finished sheet metal material of thickness as necessary to structurally support weight of rain water loading according to manufactures calculation charts; but in no case less than 24 gauge. Neatly miter all angled joints & elbows. Provide the following fabricated downspout accessories as required: 16-gauge x 1 1/4" wide hanger straps of matching material w/ anchor fasteners, minimum three per downspout; precast concrete splash blocks; 24 gauge fabricated splash pans, etc.
- E. Downspout strainers shall be installed in top of each downspout. Metal strainers shall be 1/2" woven mesh not less than 4" high and extend full coverage into downspout.

2.6 Miscellaneous Sheet Metal Work

Sheet metal items not covered elsewhere in this section shall be as indicated on the drawings and as required to form a watertight installation. Profiles, bends, and intersections shall be sharp, even, and true. Joints shall be locked, or lapped and soldered, as applicable.

- A. Metal Flashing and Counter Flashing exposed to view. Fabricate and install in accordance with related work manufacturer's requirements.

- 1. Flashing for all projections through walls and/or roof which are not furnished under other sections.

2. Metal flashing for equipment specified under Plumbing, Mechanical, and/or Electrical Sections, projecting through the walls and/or roof shall be furnished under the respective sections and accepted / installed under this section.
- B. Accessories
All accessories or other items essential to completeness of sheet metal installation, though not specifically shown or specified, shall be provided compatible with comparable material specified.
- 2.7 Plumbing Vent Flashing
All plumbing stacks projecting through the roof shall be flashed appropriately according to compatibility with roofing system with either: 3 lb. lead flashing extending up plumbing vent stack and turned down into vent stack (minimum 1") or prefabricate Deck-tight as approved by the roofing system manufacturer.
- 2.8 Project Identification Plaque
Provide an engraved aluminum plaque, nominal 4"x 6" x 1/8" thick, with information pertinent to the project including the following: Date of roofing installation, Roofing Manufacturer, Contractor, Architect, Roofing Product, Warranty period, etc.

3.0 - EXECUTION

- 3.1 General
 - A. All sheet metal work, including but not limited to: flashing, counter flashing, gravel stops, post / pipe flashing, fascia, trim flashing, rake flashing, gutters, downpipes, scuppers, pans, etc. shall be quality installed as required and/or indicated on the drawings for a complete weathertight system.
 - B. Surfaces to which sheet metal is applied shall be even, smooth, sound, thoroughly clean and dry, and free from defects that might affect the application or appearance.
 - C. Materials furnished under this section which are to be built in by others shall be delivered to the site in time to avoid delays to construction progress.
 - D. All cutting, fitting, drilling, and other operations in connection with sheet metal required to accommodate the work of other trades shall be performed under this section. Torch cutting or abrasive saw cutting shall not be allowed.
 - E. Where sheet metal is in contact with dissimilar metals, mortar, concrete or masonry materials, the dissimilar surfaces shall be kept from direct contact by painting the contact surfaces with a coating of an approved bitumastic compound. Sheet metal in contact with treated wood shall have an underlayment backing of waterproof membrane for contact separation.
 - F. Plumbing vents roof penetrations shall be located and provided by the Roofing Contractor in coordination with the Plumbing Contractor.
- 3.2 Fabrication
 - A. Fabricate and install sheet metal with lines, arises, and angles sharp and true and plane surfaces free from wave, warp, or buckle. Exposed edges of sheet metal shall be folded back to form a 1/2" wide hem on the side concealed from view. Finished work shall be free from water leakage under all weather conditions.

- B. All items shall be fabricated in maximum lengths. All joints shall be held to a minimum and spaced symmetrical. Joints shall be neatly sealed with an elastomeric sealant to achieve weathertightness.

3.3 Expansion

All sheet metal work shall be so designed and anchored that the work will not be "oil-can" distorted nor the fastenings seriously stressed from expansion and contraction of the metal.

3.4 Installation

- A. This contractor shall cooperate and coordinate with other trades in the correct placing of anchorage and the preparation of surfaces which are to receive sheet metal work. Any defects in the work of other trades shall be reported to the architect. The beginning of installation work by this contractor shall indicate his acceptance of adjoining work.
- B. All sheet metal work shall be set level and to true planes as indicated on the drawings and installed as intended in a first quality manner according to standards of SMACNA and industry standards for a complete watertight flashing system.
- C. Anchor bolt or screws used to secure the work to other materials or at expansion joint covers shall be tightened sufficiently to properly secure the work and still permit expansion and contraction of the assembly.
- D. Install roof drainage accessories as required for a complete watertight roof drainage system according to the standards of SMACNA.

Gutters

- 1. Gutters shall be installed to slope to downspouts
- 2. Gutter joints shall be lapped, riveted and soldered and sealed with elastomeric sealant to prevent leaking.
- 3. Provide expansion joint with back-to-back sealed end closures not to exceed 50' o.c. and joint caps to lap 4" minimum.
- 4. Anchor gutter sections at upper limits to eave or fascia with straps to support outer limits at 30" o.c. max.
- 5. Provide gutters with sealed end closures.

Downspouts

- 1. Provide sealed outlet tube at connection to gutter.
 - 2. Provide 1 ½" telescoping section joints
 - 3. Provide Fastener straps to secure downspout to and 1" off of the wall at approximately 48" o.c.
 - 4. Provide turn-out elbows where indicated to direct water away from the building base onto splash blocks on grade or splash pans on adjacent roof surface. Splash pans shall be set in elastomeric sealant. Provide strait boot connection where boots are indicated to direct water into below ground storm drainage.
 - 5. Coordinate location of downspouts with architectural building elevation drawings; contact the Architect if conflicts occur.
 - 6. Minimum size 4" x 5"
- E. Utilize appropriate fasteners to penetrate substrate as follows: 1 ¼" minimum for nails and ¾" minimum for screws. Fasteners into treated wood shall be stainless steel.
 - 1. Fasten roof edge flashing per recommendation of FMG Loss Prevention

Data Sheet 1-49 according to zone but space not more than 4" o.c. staggered.

2. Bottom limits of roof edge flashing shall be provided with interlocked continuous cleats fastened to substrate 12" o.c.
- F. Pipe / Post Flashing shall be wrap-around umbrella type with tightened s.s. draw band and flared upper edge with sealant fill to achieve minimum 5" of coverage at pipe / post perimeter.
- G. Permanently attach the Project Identification Plaque where readily visible from the roof and in immediate proximity of the work of this project.

3.5 Roof Flashing Installation

- A. General: Install sheet metal roof flashing and trim to comply with performance requirements, NRCA's "Roofing and Waterproofing Manual" and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and no less than 4" on center staggered.
 1. Interlock bottom edge of roof edge flashing with continuous cleats anchored to substrate at 12" centers through the vertical leg face.
- C. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.
- D. Counterflashing: Coordinate installation of counterflashing with installation of roof flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches (100 mm) over counter flashing. Lap counterflashing joints a minimum of 4 inches (100 mm) and bed with elastomeric sealant.
 1. Secure in a waterproof manner by means of snap-in installation and sealant or lead wedges and sealant; interlocking folded seam or blind rivets and sealant as indicated.
- E. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Install flashing as follows:
 1. Seal with elastomeric sealant and clamp flashing to pipes penetrating roof.

3.6 Wall Flashing Installation

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Reglets: Saw-cut reglets a minimum of one (1") inch deep by one quarter (1/4") inch wide into masonry substrate/wall at locations indicated.

3.7 Miscellaneous Flashing Installation

- A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

3.8 Cleaning and Protection

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.
- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.
- E. After installation is completed, all sheet metal work shall be cleaned with solution recommended by Metal Manufacturers. Refinish metal where necessary, replace damaged parts, and leave in complete and finished condition.

3.9 Warranty

- A. Provide Manufacturer's Standard Twenty (20) Year Finish Warranty to support factory finish shall not chalk, peel, crack, fade or change in color in excess of 2 NBS units as per ASTM D 2244-68.
- B. The work of this section shall be concurrently covered under the "General Contractor's Five (5) Year Roofing Guarantee" as required by the State of Alabama per Division 1.

END OF SECTION

1.0 - GENERAL

1.1 Scope

The work under this section consists of caulking and sealants.

1.2 Work Included

See the drawings for all items and places requiring caulking. Completely seal with specified caulking compound joints around door frame and frame base and window frames (inside and outside); all other openings in masonry, concrete, or precast concrete joints in or between precast concrete panels; beneath all exterior thresholds; around plumbing fixtures; all places indicated on the drawings to be caulked; and all other places where caulking is required, whether specifically shown on the drawings or not.

1.3 Submittals

Submit for approval product literature and samples of all materials proposed for use. Colors to be approved in the field by the Architect to match adjacent construction color.

2.0 - PRODUCTS

2.1 Sealant

- A. Exterior sealant shall be a gun grade one part silicone compound. Materials shall be Tremco Spectrem 1, Dow Corning No. 790 or Pecora No. 890, color as selected.
- B. Primer, if required, for the silicone sealant shall be a quick drying clean primer as recommended by the manufacturer of the material used.

2.2 Caulking

- A. Interior caulking compound shall be a paintable, one part, gun grade butyl rubber base material equal to Tremco Tremflex 834 Acrylic, Pecora BC-158 or DAP Butyl Flex or acrylic latex base caulking compound equal to Pecora AC-20 or DAP Latex Caulk.
- B. Floor Caulking compound shall be a tintable, semi-self leveling polyurethane base equal to Tremco THC900/901. Colors shall be selected by Architect from manufacturers entire line of colors.

2.3 Fire Caulking

All locations indicated and/or all penetrations or openings into fire barriers shall be sealed with fire caulk material meeting UL requirements for such application. Submit product literature indicating UL compliance for approval. All trades shall use same fire caulk product. Installer shall be certified by the manufacturer.

2.4 Compressible Joint Sealant

Sealant shall be compressible polyurethane foam impregnated with polybutylene, Polytite as manufactured by Polytite Manufacturing Corporation, or other material as approved.

2.5 Filler

Filler shall be polyethylene foam, polyurethane foam, untreated jute, pointing mortar or other oil-free materials subject to approval of the manufacturer of the caulking or sealant compound.

2.6 Accessories

- A. Bond breaker shall be polyethylene tape.
- B. Solvents, cleaning agents, and other accessory materials shall be as recommended by the sealant manufacturer.

3.0 - EXECUTION

3.1 Joint Preparation

- A. Joints deeper than 1/2" shall be built up to a depth of 3/8" below adjacent surfaces with approved filler material prior to applying sealant. All surfaces must be clean and dry. Any protective coating or foreign matter such as oil, dust, grease, dirt, or frost on building materials that will impair bond shall be removed. Masonry and concrete surfaces shall be sound. If required by manufacturer's instructions, apply brush coat of primer to surfaces and allow to dry before applying sealant.
- B. At the option of the applicator, the surfaces next to the joints may be masked to obtain a clean neat line. Remove tape immediately after tooling the sealant.

3.2 Application

- A. Caulking or sealant shall be used from manufacturer's original cartridge in a standard open type, hand operated caulking gun. Nozzle shall be cut to proper size to obtain a neat, smooth and uniform bead. When handling bulk material, manufacturer's instructions shall be followed.
- B. A full bead of caulking or sealant shall be applied into joint under sufficient pressure, drawing nozzle across caulking or sealant to leave a slightly concave surface. Tool with a caulking tool or soft bristled brush moistened with solvent within 10 minutes after exposure. All sealed joints shall be watertight.
- C. Joints shall be caulked before painting adjacent work. Do not paint over silicone sealant compound.
- D. Fire caulk shall be installed to comply with manufacturer's requirements, UL requirements, and requirements of authority having jurisdiction.

3.3 Clean-up

On non-porous surfaces, excess uncured caulking shall be immediately removed with a solvent moistened cloth. On porous surfaces, excess caulking should be allowed to cure overnight, then remove by lightly wire brushing or sanding. All adjacent surfaces shall be clean and free from stains.

END OF SECTION

HOLLOW METAL DOORS & FRAMES - SECTION 08110

1.0 - GENERAL

- 1.1 Scope
Furnish and install all hollow metal doors and frames including view windows, as indicated on the drawings and herein specified.
- 1.2 Submittals
 - A. Submit shop drawings for approval.
 - B. Drawings shall show a schedule of openings using architectural opening numbers, all dimensions, jamb and head conditions, construction details, preparations for hardware, gauges, and finish.
- 1.3 Templates
 - A. Manufacturer shall obtain templates of all applicable hardware from the Finish Hardware Contractor and make proper provision for the installation of this hardware.
 - B. Unless otherwise specified in the hardware section of the specifications, hardware locations shall be in accordance with the recommendations of The National Builder's Hardware Association.
- 1.4 Marking and Storage
Mark each frame for intended location. Store frames off the ground and in a manner to protect them from damage.
- 1.5 Storage
 - A. Doors shall be stored in a dry, secure location to prevent exposure to weather and/or moisture.
 - B. Frames shall be stored off the ground and protected from weather until in place.

2.0 - PRODUCTS

- 2.1 Door Construction
 - A. Exterior Doors: Formed up sheets not less than 16 U.S. gauge rigidly connected and reinforced inside with continuous interlocking 20-gauge hat stiffeners, spaced a maximum of 6" apart. Interior Doors: Formed up sheets not less than 18 U.S. gauge rigidly connected and reinforced inside with continuous interlocking 20-gauge hat stiffeners, spaced a maximum of 6" apart. Sound deadening material of rock wool batts, insulites or other standard recognized available sound deadening materials shall be placed between all stiffeners and plates. Honeycomb doors are not acceptable. Suitable provision shall be made to receive glass panels or louvers. Edge seams are to be continuously welded and ground smooth. Bondo seams are not acceptable.
 - B. Doors and frames shall be equal to Steelcraft, Curries, Pioneer or approved equal.
 - C. Doors shall be coordinated with thresholds specified under FINISH HARDWARE - SECTION 08710 to meet A.D.A. requirements. Doors shall be extended as required to seal against threshold.
 - D. Hollow metal doors shall be provided with beveled hinge and lock edges. Bevel

hinge and lock door edges 1/8 inch (3 mm) in 2 inches (50 mm).

E. Exterior door face sheets shall be galvanized steel, level A60 (ASTM A653).

F. Hardware preparation for hollow metal doors: hinge reinforcements shall be minimum 7-gauge x 9" length.

G. Hardware Reinforcements:

1. Hinge reinforcements for full mortise hinges: minimum 7 gage [0.180" (4.7mm)].
2. Lock reinforcements : minimum 16 gage [0.053" (1.3mm)].
3. Closer reinforcements : minimum 14 gage [0.067" (1.7mm)], 20" long.
4. Galvanized doors: include Galvanized hardware reinforcements. Include Galvanized components and internal reinforcements with Galvanized doors. Close tops of exterior swing-out doors to eliminate moisture penetration. Galvanized steel top caps are permitted.
5. Projection welded hinge and lock reinforcements to the edge of the door.
6. Provided adequate reinforcements for other hardware as required.

H. Electrical Requirements for Doors:

General: Coordinate electrical requirements for doors and frames. Make provisions for installation of electrical items arranged so that wiring can be readily removed and replaced.

1. Doors with Electric Hinges:
 - a. General: Furnish conduit raceway to permit wiring from electric door hardware.
 - b. Hinge Locations: Provide electric hinge at intermediate or center location. Top or bottom electric hinge locations are not acceptable.
 - c. Refer to 08710 for electrified hardware items.

2.2 Frame Construction

- A. Frames shall be of sizes as indicated, completely assembled, buck and frame formed from 14-gauge exterior, 16-gauge interior, steel with 2" face unless otherwise indicated and 5/8", minimum, integral stop. Exterior frames and interior frames at cafeteria, kitchen, locker room and shower areas shall be Galvanized A60 (ASTM A653).
- B. Corners of frames to be mitered and continuously welded. Joints shall be pulled up tight, welded, and ground smooth with faces in correct alignment.
- C. Provide adjustable "T" type anchors, three to each jamb; welded angle clips at bottom of frames for anchorage to floor construction; detachable type metal spreaders. Jamb anchors shall be T-shaped and of the same thickness as the metal of the frames. Where "T" anchors are not feasible, provide anchors as required and/or recommended.

- D. Machine frames for attachment of hardware, including special reinforcing for extra heavy duty use, drilling, and tapping. Provide mortar tight metal dust boxes in back of lock location.
- E. Prepare frames for rubber silencers, three for single swing door and two for each pair of doors.
- F. Frames not extending to the floor surface shall have a closed welded jamb bottom.
- G. **While in the shop and prior to shipping, all frames to be installed in masonry shall be thoroughly coated on the inside surface with a bituminous water resistant paint.**
- H. Electrical Requirements for Frames:
 - 1. General: Coordination all electrical requirements for doors and frames. Make provisions for installation of electrical items arranged so that wiring can be readily removed and replaced.
 - a. Provide cutouts and reinforcements required for metal door frame to accept electric components.
 - b. Frame with Electrical Hinges: Weld UL listed grout guard cover box welded over center hinge reinforcing. Top or bottom hinge locations are not permitted. Contractor to reference 3.01.E, for continuous hinges.
 - c. Provide cutouts and reinforcements required to accept security system components.
 - d. Refer to 08710 for electrified hardware items.
 - 2. Provide mortar box, welded in head of door frame at exterior frames for future door contact switch provided by Owner. Size, type, location and conduit requirements to be provided by Owner.

2.3 Finish

- A. Metal doors and frames shall be thoroughly cleaned of dirt, grease, and impurities and shall be bonderized and finished with one coat of baked-on primer ready to receive finish paint.
- B. Primer shall be manufacturer's standard in accordance with ASTM B117.
Do not prime paint labels.
- C. Final painting as specified and applied under Painting Section.

3.0 - EXECUTION

3.1 Installation

- A. **VERIFY THAT ALL FRAMES TO BE INSTALLED IN MASONRY HAVE BEEN COATED WITH A BITUMINOUS WATER RESISTANT PAINT IMMEDIATELY PRIOR TO INSTALLATION.**
- B. Install frames plumb, rigid, and in true alignment; properly brace until built in. Set

spreader and attached jambs to floor through floor anchors.

- C. In masonry openings, where required, install a second spreader at the mid-height of the door opening, and do not remove until the masonry jambs are in place. Spreader shall be notched wood of approximate jamb width and 1" minimum thickness. Install a minimum of three anchors per jamb to be imbedded in masonry joint as the wall is laid up.
- D. Frames shall be grouted solid.
- E. Doors shall be rigidly secured in frames, hardware applied, and adjusted to achieve smooth operation without forcing or binding. Doors shall be capable of maintaining any degree of opening.

3.2 Protection

After installation, doors and frames shall be protected from damage during subsequent construction activities. Damaged doors and frames shall be replaced.

END OF SECTION

1.0 – GENERAL

1.1 Section Includes

- A. Glazed Aluminum Sectional Overhead Doors.
- B. Electric Operators and Controls.
- C. Operating Hardware, tracks, and support.

1.2 Related Sections

- A. Section 04210 - Unit Masonry :Prepared opening in masonry. Execution requirements for placement of anchors in masonry wall construction.
- B. Section 05500 - Miscellaneous Metals.
- C. Section 07910 - Joint Sealers: Perimeter sealant and backup materials.
- D. Section 08710 - Door Hardware: Cylinder locks.
- E. Section 09910 - Paints and Coatings: Field painting.
- F. Section 13100– Pre-Engineered Steel Building.
- G. Division 16 - Raceway and Boxes: Empty conduit from control station to door operator. Wiring Connections: Electrical service to door operator.

1.3 References

- A. ANSI/DASMA 102 - American National Standard Specifications for Sectional Overhead Type Doors.

1.4 Design / Performance Requirements

- A. Wind Loads: Design and size components to withstand loads caused by pressure and suction of wind acting normal to plane of wall as calculated in accordance with 2015 International Building Code.
- B. Wiring Connections: Requirements for electrical characteristics.
 - 1. 115 volts, single phase, 60 Hz.
- C. Single-Source Responsibility: Provide doors, tracks, motors, and accessories from one manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components.

1.5 Submittals

- A. Submit under provisions of Section 01350.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.

3. Installation methods.

- C. Shop Drawings: Indicate plans and elevations including opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.
- D. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- E. Operation and Maintenance Data.

1.6 Quality Assurance

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
- B. Installer Qualifications: Authorized representative of the manufacturer with minimum five years documented experience.
- C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc. acceptable to authority having jurisdiction as suitable for purpose specified.

1.7 Delivery, Storage, and Handling

- A. Store products in manufacturer's unopened labeled packaging until ready for installation.
- B. Protect materials from exposure to moisture until ready for installation.
- C. Store materials in a dry, ventilated weathertight location.

1.8 Project Conditions

- A. Pre-Installation Conference: Convene a pre-installation conference just prior to commencement of field operations, to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.

2.0 - PRODUCTS

2.1 Manufacturers

- A. Basis of Design is: Manufacturer: Overhead Door Corp - 521 Series Aluminum Sectional Overhead Doors
- B. Other Manufacturers considered to have similar products and are approved to bid subject to compliance with the plans and specifications is Wayne Dalton.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01360.

2.2 Glazed Aluminum Sectional Overhead Doors

- A. 521 Series Aluminum Sectional Overhead Doors.
Units shall have the following characteristics:

1. Door Assembly: Stile and Rail assembly with 1/4 inch diameter through rods.
 - a. Panel Thickness: 1-3/4 inches.
 - b. Center Stile Width 2-11/16 inches
 - c. End Stile Width: 3-5/16 inches
 - d. Intermediate Rail Pair Width – 3-11/16 inches
 - e. Top Rail Width: 2-3/8 inches
 - f. Bottom Rail Width: 3-3/4 inches
 - g. Aluminum Panels: 0.050 inch thick aluminum
 - h. Stiles and Rails: 6063 – T6 Aluminum
 - i. Springs: 10,000 cycles
 - j. Interior Glazing – 1/4 inch Tempered Glass Exterior Glazing 1/2 inch Low-E Insulated Glazing
2. Finish and Color: Powder Coated finish – Color to be selected by Architect.
3. Windload Design: Provide to meet the Design/Performance requirements specified.
4. Hardware: Galvanized steel hinges and fixtures. Ball bearing rollers with hardened steel races.
5. Lock: Interior Glazed single Unit – Exterior Only
6. Weatherstripping: Bottom seal is standard – Exterior Only
 - a. Flexible bulb-type strip at bottom section.
 - b. Flexible Jamb seals.
 - c. Flexible Header seal.
7. Track: Provide track as recommended by manufacturer to suit loading required and clearances available.
8. Electric Motor Operation: Provide UL listed electric operator, size and type as recommended by manufacturer to move door in either direction at not less than 2/3 foot nor more than 1 foot per second. Operator shall meet UL325/2010 requirements for continuous monitoring of safety devices.
 - a. Entrapment Protection: Required for momentary contact, includes radio control operation. Photoelectric sensors monitored to meet UL 325/2010.
9. Operator Controls:
 - a. Push-button and key operated control stations with open, close, and stop buttons.
 - b. Surface mounting.
 - c. Both Interior and exterior location.

3.0 - EXECUTION

3.1 Examination

- A. Do not begin installation until openings have been properly prepared.
- B. Verify wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.
- C. Verify electric power is available and of correct characteristics.
- D. If preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 Preparation

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 Installation

- A. Install overhead doors and track in accordance with approved shop drawings and the manufacturer's printed instructions.
- B. Coordinate installation with adjacent work to ensure proper clearances and allow for maintenance.
- C. Anchor assembly to wall construction and building framing without distortion or stress.
- D. Securely brace door tracks suspended from structure. Secure tracks to structural members only.
- E. Fit and align door assembly including hardware.
- F. Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.

3.4 Cleaning and Adjusting

- A. Adjust door assembly to smooth operation and in full contact with weatherstripping.
- B. Clean doors, frames and glass.
- C. Remove temporary labels and visible markings.

3.5 Protection

- A. Do not permit construction traffic through overhead door openings after adjustment and cleaning.
- B. Protect installed products until completion of project.
- C. Touch-up, damaged coatings and finishes and repair minor damage before Substantial Completion.

END OF SECTION

SECTION 08710 – FINISH HARDWARE

1.0 - 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 items known commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.
- B. This Section includes the following:
 - 1. Architectural Hinges
 - 2. Continuous Hinges
 - 3. Pivots Sets
 - 4. Key Control System, Cylinders and Cores.
 - 5. Locksets, Latchsets and Deadbolts
 - 6. Panic Devices and Fire Rated Exit Devices
 - 7. Closers and Door Control Devices
 - 8. Automatic Door Operators
 - 9. Overhead Door Stops and Holders
 - 10. Floor and Wall Stops
 - 11. Door Bolts and Coordinators
 - 12. Door Pulls, Push/Pull Plates and Push/Pull Sets
 - 13. Protective Plates
 - 14. Door Seals, Gasketing and Weatherstripping
 - 15. Thresholds
 - 16. Miscellaneous Door Control Devices
 - 17. Electromechanical Hardware
 - 18. Miscellaneous Access Control Components and Security Equipment
- C. Related Sections: The following Sections contain requirements that relate to the following sections.
 - 1. Section 08110: Hollow Metal Doors and Frames
 - 2. Division 16: Electrical
- D. Products furnished but not installed under this Section to include:
 - 1. Cylinders for locks on entrance doors.
 - 2. Final replacement cores and keys to be installed by Owner.

1.3 References

- A. Standards of the following as referenced:
 - 1. American National Standards Institute (ANSI)
 - 2. Door and Hardware Institute (DHI)
 - 3. Factory Mutual (FM)
 - 4. National Fire Protection Association (NFPA)
 - 5. Underwriters' Laboratories, Inc. (UL)
 - 6. UL 10C - Fire Tests Door Assemblies
 - 7. Warnock Hersey
- B. Regulatory standards of the following as referenced:
 - 1. Department of Justice, Office of the Attorney General, *Americans with Disabilities Act*, Public Law 101-336 (ADA).
 - 2. CABO/ANSI A117.1: *Providing Accessibility and Usability for Physically*

1.4 System Description

1.5 Submittals

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification sections.
- B. Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements. For items other than those scheduled in the "Headings" of Section 3, provide catalog information for the specified items and for those submitted.
- C. Final hardware schedule coordinated with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. Final Hardware Schedule Content: Based on hardware indicated, organize schedule into vertical format "hardware sets" indicating complete designations of every item required for each door or opening. Use specification heading numbers with any variations suffixed a, b, etc. Include the following information:
 - a. Type, style, function, size, and finish of each hardware item.
 - b. Name and manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of each hardware set cross-referenced to indications on Drawings both on floor plans and in door and frame schedule.
 - e. Explanation of all abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for hardware.
 - g. Door and frame sizes and materials.
 - h. Keying information.
 - i. Cross-reference numbers used within schedule deviating from those specified.
 - j. Column 1: State specified item and manufacturer.
 - k. Column 2: State prior approved substituted item and its manufacturer.
 - 2. Furnish complete wiring diagrams, riser diagrams, elevation drawings and operational descriptions of electrical components and systems, listed by opening in the hardware submittals. Elevation drawings shall identify locations of the system components with respect to their placement in the door opening. Operational descriptions shall fully detail how each electrical component will function within the opening, including all conditions of ingress and egress. Provide a copy with each hardware schedule submitted for approval. Supply a copy with delivery of hardware to the jobsite and another copy to the Owner at the time of project completion.
 - 3. Submittal Sequence: Submit final schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work that is critical in the Project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by door hardware, and other information essential to the coordinated review of schedule.
 - 4. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.
- D. Provide samples if requested of each type of exposed hardware unit in finish indicated and tagged with full description for coordination with schedule. Submit samples prior to submission of final hardware schedule.
 - 1. Samples will be returned to the supplier. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after

final check of operation, be incorporated in the Work, within limitations of keying coordination requirements.

- E. Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- F. Contract closeout submittals:
 - 1. Operation and maintenance data: Complete information for installed door hardware.
 - 2. Warranty: Completed and executed warranty forms.

1.6 Quality Assurance

- A. Single Source Responsibility: Obtain each type of hardware (latch and locksets, hinges, closers, etc.) from a single manufacturer.
 - 1. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that employs an experienced Architectural Hardware Consultant (AHC) who is available for consultation to Owner, Architect, and Contractor, at reasonable times during the course of the Work.
- B. Coordination Meetings:
 - 1. Contractor to set up and attend the following:
 - a. Lock distributor to meet with the Owner to finalize lock functions and keying requirements and to obtain final instructions in writing.
 - b. Lock distributor and lock, closer and exit device manufacturer to meet with the installer prior to beginning of installation of door hardware. Instruct installer on proper installation of specified products.
 - 2. General Contractor to set up and attend the following:
 - 3. Meet with the Owner, General Contractor, Supplier, electrical and security contractors to coordinate all electrical hardware items. Supplier to provide riser diagrams, elevation drawings, wiring diagrams and operational descriptions as required by the General and sub-contractors.
- C. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 requirements of authorities having jurisdiction.
 - 1. Provide only items of door hardware that are listed and tested by UL or Warnock Hersey for given type/size opening and degree of label. Provide proper latching hardware, door closers, approved-bearing hinges and seals whether listed in the Hardware Schedule or not. All hardware to comply with State and local codes and UL 10C.
 - 2. Where emergency exit devices are required on fire-rated doors, (with supplementary marking on doors' UL labels indicating "Fire Door to be equipped with Fire Exit Hardware") provide UL label on exit devices indicating "Fire Exit Hardware".
- D. All hardware is to comply with Federal and State Handicap laws.
- E. Substitutions: Request for substitutions of items of hardware other than those listed as "acceptable and approved" shall be made to the architect in writing no later than fourteen (14) days prior to bid opening. Approval of substitutions will only be given in writing or by Addenda. Requests for substitutions shall be accompanied by samples and/or detailed information for each manufacturer of each product showing design, functions, material

thickness and any other pertinent information needed to compare your product with that specified. Lack of this information will result in a refusal.

F. Pre-Installation Coordination:

1. Installation of hardware shall be installed or directly supervised and inspected by a skilled installer certified by the manufacturer of locksets, door closers, and exit devices used on the project, or with not less than 3 years' experience in successful completion of projects similar in size and scope.
2. Schedule a hardware pre-installation meeting on site to review and discuss the installation of continuous hinges, locksets, door closers, exit devices, overhead stops, and electromechanical door hardware.
3. Meeting attendees shall be notified 7 days in advance and shall include: Architect, Contractor, Door Hardware Installers (including low voltage hardware), Manufacturers representatives for above hardware items, and any other effected subcontractors or suppliers.
4. All attendees shall be prepared to distribute installation manuals, hardware schedules, templates, and physical hardware samples.

1.7 Product Handling

- A. Tag each item or package separately with identification related to final hardware schedule and include basic installation instructions with each item or package.
- B. Packaging of door hardware is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.
- C. Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.
- D. Deliver individually packaged door hardware items promptly to place of installation (shop or Project site).
- E. Provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of the Work will not be delayed by hardware losses both before and after installation.

1.8 Warranty

- A. Special warranties:
 1. Door Closers: Thirty Year Period
 2. Exit Devices: Three Year Period
 3. Electrified Exit Devices: Two Year Period
 4. Automatic Door Operators: Two Year Period

1.9 Maintenance

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions that are packed in hardware items for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.
- B. Parts kits: Furnish manufacturers' standard parts kits for locksets, exit devices, and door closers.

2.0 - PRODUCTS

2.1 Manufactured Units

- A. Geared Continuous Hinges:
1. Acceptable manufacturers:
 - a. Ives*
 - b. Select Products
 - c. Markar
 2. Characteristics:
 - a. Continuous gear hinges to be manufactured of extruded 6063-T6 aluminum alloy with anodized finish, or factory painted finish as scheduled.
 - b. All hinges are to be manufactured to template. Uncut hinges to be non-handed and to be a pinless assembly of three interlocking extrusions applied to the full height of the door and frame without mortising.
 - c. Vertical door loads to be carried on chemically lubricated polyacetal thrust bearings. The door and frame leaves to be continually geared together for the entire hinge length and secured with a full cover channel. Hinge to operate to a full 180°.
 - d. Hinges to be milled, anodized and assembled in matching pairs. Fasteners supplied to be steel self-drilling, self-tapping 12-24 x 3/4" screws.
 - e. Provide UL listed continuous hinges at fire doors. Continuous hinges at fire doors (suffix -FR) to meet the required ratings without the use of auxiliary fused pins or studs.
- B. Pivot Sets:
1. Acceptable manufacturers:
 - a. Ives*
 - b. McKinney
 - c. Rixson
 2. Characteristics:
 - a. Provide pivot sets complete with oil-impregnated top pivot, unless indicated otherwise.
 - b. Where offset pivots are specified, Provide one intermediate pivot for doors less than 91 inches high and one additional intermediate pivot per leaf for each additional 30 inches in height or fraction thereof. Intermediate pivots spaced equally not less than 25 inches or not more than 35 inches on center, for doors over 121 inches high.
 - c. Provide appropriate model where pivot sets are scheduled at fire rated openings.
 - d. Provide lead-lined model where pivot sets are specified at lead-lined doors.
 - e. Provide pivots with electrified options as scheduled in the hardware sets. Provide with sufficient number and wire gage to accommodate electric function of specified hardware. Locate electrified pivot nearest to electrified locking component. If manufacturer of electrified locking component requires another device for power transfer then provide recommended power transfer device and appropriate quantity of pivots.
 - f. Provide mortar guard for each electric pivot specified, unless specified in hollow metal frame specification.
- C. Cylinders and Keying:
1. Acceptable manufacturers:
 - a. Match Existing Keying System.
 2. Characteristics:
 - a. Existing System: Grandmaster key the locks to the Owner's existing system, with a new master key for the Project.
 - b. Review the keying system with the Owner and provide the type required

(master, grandmaster or great-grandmaster), either new or integrated into Owner's existing system.

- c. Metals: Construct lock cylinder parts from brass or bronze, stainless steel, or nickel silver.
- d. Comply with Owner's instructions for master keying and, except as otherwise indicated, provide individual change key for each lock that is not designated to be keyed alike with a group of related locks.
- e. Permanently inscribe each key with number of lock that identifies cylinder manufacturer's key symbol, and notation, "DO NOT DUPLICATE".
- f. Key Material: Provide keys of nickel silver only.
- g. Furnish the following Key Quantities:
 - 1) Three (3) change keys for each lock.
 - 2) Five (5) master keys for each master system.
 - 3) Five (5) grandmaster keys for each grandmaster system.
 - 4) Ten (10) construction master keys.
 - 5) Two (2) construction Control Keys.
 - 6) One (1) extra blank for each lock.
- h. Furnish construction master keys to General Contractor.
 - 1) Deliver keys to Owner.

D. Exit Devices:

- 1. Acceptable manufacturers:
 - a. Von Duprin 98 Series*
 - b. Sargent 8000 Series
 - c. Corbin Russwin ED5000 Series
- 2. Characteristics:
 - a. Exit devices to be UL Listed for life safety. Exit devices for fire rated openings to have "UL" labels for "Fire Exit Hardware."
 - b. Exit devices mounted on labeled wood doors to be mounted on the door per the door manufacturer's requirements.
 - c. All trim to be thru-bolted to the lock stile case.
 - d. Lever trim to be solid case material with a break-away feature to limit damage to the unit from vandalism. Lever design to match locksets.
 - e. All exit devices to be made of brass, bronze, stainless steel, or aluminum material, powder coated, anodized, or plated to the standard architectural finishes to match the balance of the door hardware.
 - f. Provide glass bead conversion kits to shim exit devices on doors with raised glass beads.
 - g. All exit devices to be one manufacturer. No deviation will be considered.
 - h. All series exit devices to incorporate a fluid damper, which decelerates the touchpad on its return stroke and eliminates noise associated with exit device operation. All exit devices to be non-handed. Touchpad to extend a minimum of 1/2 of the door width and to extend to the height of the cross rail housing for a "no pinch" operation. Plastic touchpads are not acceptable. All latchbolts to be the deadlocking type. Latchbolts to have a self-lubricating coating to reduce wear. Plated or plastic coated latchbolts are not acceptable. Plastic linkage and "dogging" components are not acceptable.
 - i. Surface vertical rod devices to be UL labeled for fire door applications without the use of bottom rod assemblies. Where bottom rods are required for security applications, the devices to be UL labeled for fire doors applications with rod and latch guards by the device manufacturer.
 - j. Exit devices to include impact resistant, flush mounted end cap design to avoid damage due to carts and other heavy objects passing through an opening. End cap to be of heavy-duty metal alloy construction and

provide horizontal adjustment to provide alignment with device cover plate. When exit device end cap is installed, no raised edges will protrude.

E. Closers and Door Control Devices:

1. Acceptable manufacturers:
 - a. LCN Closers 4020 Series*
 - b. Norton 9500 Series
 - c. Sargent 281 Series
2. Characteristics:
 - a. Door closers to have fully hydraulic, full rack and pinion action with a high strength cast iron cylinder.
 - b. All closers to utilize a stable fluid withstanding temperature range of 120°F to -30°F without seasonal adjustment of closer speed to properly close the door. Closers for fire-rated doors to be provided with temperature stabilizing fluid that complies with standards UBC 7-2 (1997) and UL 10C.
 - c. Spring power to be continuously adjustable over the full range of closer sizes, and allow for reduced opening force for the physically handicapped. Spring power adjustment (LCN Fast™ Power Adjust) allows for quick and accurate power adjustment and visually shows closer power size settings by way of dial adjustment gauge located on closer spring tube. Hydraulic regulation to be by tamper-proof, non-critical valves. Closers to have separate adjustment for latch speed, general speed and back check.
 - d. All closers to have solid forged steel main arms (and forearms for parallel arm closers) and where specified to have a cast-in solid stop on the closer shoe ("CUSH"). All parallel arm mounted closers to have "EDA" type arms or, where door travel on out-swing doors must be limited, use "CUSH" or "SCUSH" type closers. Auxiliary stops are not required when "CUSH" type closers are used. Provide drop plates where top rail of door is not sufficient for closer mounting. Provide "cush shoe supports" and "blade stop spacers" where dictated by frame details.
 - e. Overhead concealed closers to have spring power adjustable for 50% increase in closing power and fully mortised door tracks.
 - f. All surface closers to be certified to exceed ten million (10,000,000) full load cycles by a recognized independent testing laboratory. All closers (overhead, surface and concealed) to be of one manufacturer and carry manufacturer's ten year warranty (electric closers to have two year warranty).
 - g. Access-Free Manual Closers: Where manual closers are indicated for doors required to be accessible to the physically handicapped provide adjustable units complying with ADA and ANSI A-117.1 provisions for door opening force.
 - h. Closers to be installed to allow door swing as shown on plans. Doors swinging into exit corridors to provide for corridor clear width as required by code. Where possible, mount closers inside rooms.
 - i. Powder coating finish to be certified to exceed 100 hours salt spray testing by ETL, an independent testing laboratory used by BHMA for ANSI certification.

F. Power Operators:

1. Acceptable manufacturers:
 - a. LCN Senior Swing Series *
 - b. Besam Swingmaster MP Series
 - c. Horton 4000LE series Series

2. Characteristics:
- a. Provide low energy automatic operator units that are electro-mechanical design complying with ANSI A156.19 where automatic operators are specified.
 - b. Operator shall be powered with a DC motor working through reduction gears. Closing shall be spring force. No manual, hydraulic, or chain drive closer will be acceptable. The motor is to be off when the door is in closing mode. The door can be manually operated with the power on or off without damage to the operator. The operator shall include variable adjustments, including opening and closing speed adjustment. Operator shall be mounted in an aluminum cover.
 - c. Provide units with manual off/auto/hold-open switch, push and go function to activate power operator, vestibule interface delay, electric lock delay, hold-open delay adjustable from 2 to 30 seconds, and logic terminal to interface with accessories, mats, and sensors.
 - d. Provide drop plates, brackets, or adapters for arms as required to suit details.
 - e. Provide hard-wired motion sensors and/or actuator switches for operation as specified. Actuators shall be weather-resistant type at exterior applications.
 - f. Provide key switches, with LED's, recommended and approved by the manufacturer of the automatic operator as required for the function as described in the operation description of the hardware sets. Cylinders: Refer to "KEYING" article, herein.
 - g. Where automatic operators are scheduled, provide complete assemblies of controls, switches, power supplies, relays, and parts/material recommended and approved by the manufacturer of the automatic operator for each individual leaf. Actuators shall control both doors simultaneously at pairs. Exterior and vestibule doors with automatic operators shall be sequenced to allow ingress or egress through both sets of openings as directed by the Architect. Locate the actuators, key switches, and other controls as directed by the Architect.
 - h. Provide units with inputs for smoke evacuation doors, where specified, which allow doors to power open upon fire alarm activation and hold open indefinitely or until fire alarm is reset, a presence detector input, which prevents a closed door from opening or a door that is fully opened from closing, a hold open toggle input, which allows remote activation for indefinite hold open and close the second time the input is activated, vestibule inputs, which allow sequencing operation of two units, and a SPDT relay for interfacing with latching or locking devices.

G. Overhead Door Holders:

- 1. Acceptable manufacturers:
 - a. Glynn Johnson*
 - b. Rixson Firemark
- 2. Characteristics:
 - a. Provide heavy duty concealed door holders of stainless steel.
 - b. Concealed holders to be installed with the jamb bracket mortised flush with the bottom of the jamb. The arm and channel to be mortised into the door.
 - c. Surface holders to be installed with the jamb bracket mounted on the stop.

H. Door Pulls:

- 1. Acceptable manufacturers:
 - a. Ives*
 - b. Trimco

- c. Rockwood Manufacturing
- 2. Characteristics:
 - a. Provide concealed thru-bolted trim.
 - b. Material to be forged stainless steel.
 - c. Provide units sized as shown in Hardware Headings.

- I. Thresholds:
 - 1. Acceptable manufacturers:
 - a. Zero Weatherstripping Co., Inc.*
 - b. Pemko
 - c. Reese Industries
 - 2. Types: Indicated in Hardware Headings.

- J. Knox Box: (As Required)
 - 1. Acceptable manufacturers:
 - a. Knox Box 3200 Series.
 - 2. Provide one surface mount Knox Box 3200 Series.
 - 3. Provide unit compatible with the local Fire Department Knox key system.
 - 4. General contractor shall install in location provided by architect.

2.2 Materials and Fabrication

- A. Manufacturer's Name Plate: Do not use manufacturers' products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise acceptable to Architect.
 - 1. Manufacturer's identification will be permitted on rim of lock cylinders only.
- B. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units by applicable ANSI/BHMA A156 series standards for each type of hardware item and with ANSI/BHMA A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.
- C. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
 - 1. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.
 - 2. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.
 - 3. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent no standard units of type specified are available with concealed fasteners.
 - 4. Do not use thru-bolts or sex bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means of adequately fastening the hardware, or otherwise found in Headings. Coordinate with wood doors and metal doors and frames. Where thru-bolts are used, provide sleeves for each thru-bolt as a means of reinforcing the work, or use sex screw fasteners.

2.3 Hardware Finishes

- A. Match items to the manufacturer's standard color and texture finish for the latch and lock sets (or push-pull units if no latch or lock sets).

- B. Provide finishes that match those established by ANSI or, if none established, match the Architect's sample.
- C. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.
- D. Provide protective lacquer coating on all exposed hardware finishes of brass, bronze, and aluminum, except as otherwise indicated. The suffix "-NL" is used with standard finish designations to indicate "no lacquer."
- E. The designations used to indicate hardware finishes are those listed in ANSI/BHMA A156.18, "Materials and Finishes," including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.
- F. All hardware to be 626 (US26D), 652 (US26D) Satin Chrome Finish, with the following exceptions:
 - 1. Overhead Holders: 630 Satin Stainless Steel

3.0 - EXECUTION

3.1 Installation:

- A. Mount hardware units at heights indicated in following applicable publications, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by Architect.
 - 1. "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.
 - 2. "Recommended Locations for Builders Hardware for Custom Steel Doors and Frames" by the Door and Hardware Institute.
 - 3. NWWDA Industry Standard I.S.1.7, "Hardware Locations for Wood Flush Doors."
- B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.
- C. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- D. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- E. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements specified in Division 7 Section "Joint Sealers".
- F. Weatherstripping and Seals: Comply with manufacturer's instructions and recommendations to the extent installation requirements are not otherwise indicated.

3.2 Adjusting, Cleaning, and Demonstrating

- A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.
 - 1. Where door hardware is installed more than one month prior to acceptance or

occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to function properly with final operation of heating and ventilating equipment.

B. Clean adjacent surfaces soiled by hardware installation.

C. Door Hardware Supplier's Field Service:

1. Inspect door hardware items for correct installation and adjustment after complete installation of door hardware.
2. Instruct Owner's personnel in the proper adjustment and maintenance of door hardware and hardware finishes.
3. File written report of this inspection to Architect.

3.3 Hardware Schedule

HARDWARE SET: A

EACH TO HAVE:

3	HINGE	5BB1HW 4.5 X 4.5 NRP 630	IVE
1	CORRIDOR LOCK	L9456 L583-363	SCH
1	CYL/CORE	AS REQUIRED	
1	SURFACE CLOSER	4111 SCUSH MC TBWMS	LCN
1	KICK PLATE	8400 8" X 2" LDW B-CS	IVE
1	RAIN DRIP	142AA (AS REQ'D)	ZER
1	GASKETING	8144SBK PSA	ZER
1	DOOR SWEEP	8198AA	ZER
1	THRESHOLD	65A-223	ZER

HARDWARE SET: B

ALL HARDWARE BY OVERHEAD/COILING DOOR MANUFACTURER/SUPPLIER.

END OF SECTION

1.0 – GENERAL

1.1 Scope

- A. The work under this section consists of all painting, finishing work and related items.
- B. Paint or Painting shall include sealers, primers, stains, and oil, alkyd, latex and enamel paints and the application of these materials on surfaces prepared to produce a complete job whether or not every item is specifically mentioned. Where items are not mentioned they shall be furnished as specified for similar work. **Only work specifically noted as being excluded shall be left unfinished.**
- C. This specification includes field painting of all exposed piping, metal, ductwork, conduit, hangers, mechanical and electrical equipment in finished spaces. A finished space is one listed in the Finish Schedule as having finish materials on walls and/or ceiling.

1.2 List of Proposed Materials

- A. The contractor shall either verify in writing that he intends to apply the products listed in the Paint Schedule, or shall submit for approval a list of comparable materials of another listed approved manufacturer. This submittal shall include full identifying product names and catalog numbers.

1.3 Submittals

- A. As soon as practicable after contract is let, submit for approval a detailed schedule of the paint proposed, listing the name of each product, and the surface to which it will be applied. Omission of any item from the approved schedule shall not relieve Contractor of his obligation.
- B. Product Data: For each paint system indicated. Include block fillers and primers.
 - 1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
 - 2. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.
 - 3. Coating Maintenance Manual: Upon conclusion of the project, the Contractor or paint manufacturer / supplier shall furnish a coating maintenance manual, such as Sherwin-Williams "Custodian Project Color and Product Information" report or equal. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product / color / finish was used, product data pages, Material Safety Data Sheet (MSDS), care and cleaning instructions, Touch-up procedures.

1.4 Storage of Materials

- A. Deliver all painting materials to job site at least three (3) days before beginning painting in original unbroken containers showing manufacturers name and type of paint, subject to Architect's inspection and approval.

- B. All materials used on the job shall be stored in a single place. Such storage place shall be kept neat and clean, and all damage thereto or its surroundings shall be made good. Any soiled or used rags, waste, and trash must be removed from the building every night, and every precaution taken to avoid the danger of fire.

1.5 Protection of Other Work

- A. The painting contractor shall furnish and lay drop cloths in all areas where painting is being done to protect floors and other work from damage. He shall be responsible for any damage to other work and shall replace any materials which have been damaged to such an extent that they cannot be restored to their original condition. All damage must be repaired to the satisfaction of the Architect.

1.6 Job, Weather, and Temperature Conditions

- A. Maintain temperature in building at constant 65° F. or above and provide adequate ventilation for escape of moisture from the building in order to prevent condensation mildew, damage to other work, and improper drying.
- B. Exterior painting shall not be done when the temperature is below 50° F., while the surface is damp, or during cold, rainy, or frosty weather, or when the temperature is likely to drop to freezing within 24 hours. Avoid painting surfaces while they are exposed to hot sun.
- C. Before painting is started in any area, the area shall be broom cleaned and excessive dust shall be removed from all areas to be painted. After painting operations begin in a given area, clean only with commercial vacuum cleaning equipment.
- D. Adequate illumination shall be provided in all areas where painting operations are in progress.

1.7 Inspection of Surfaces

- A. Before starting any work, surfaces to receive paint finishes shall be examined carefully for defects which cannot be corrected by the procedures specified under paint manufacturers recommended "Preparation of Surfaces" and which might prevent satisfactory painting results. Work shall not proceed until such damages are correct.
- B. At areas of existing previously painted surface, the painting contractor shall field verify to assure compatibility between existing paint / coating material and the proposed new paint / coating material prior to procuring such new materials or products. Should a material or product compatibility conflict be discovered, the Contractor shall immediately notify the Architect for direction prior to proceeding with procuring such materials or products.
- C. The beginning of work in a specific area shall be construed as acceptance of the surfaces and the Contractor shall be fully responsible for satisfactory work.

1.8 Quality Assurance

- A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

- B. Source Limitations: Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats. An inspection is required by manufacture in between prime coat and finish. Per the request of the Architect.
- C. Coordination of Work: Review other Sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings systems for various substrates. Upon request from other trades, furnish information or characteristics of finish materials provided for use, to ensure compatible prime coats are used.
- D. Benchmark Samples (Mockups): Provide a full-coat benchmark finish sample for each type of coating and substrate required. Comply with procedures specified in PDCA P5. Duplicate finish of approved sample Submittals.

1.9 Cooperation With Other Trades

- A. This work shall be scheduled and coordinated with other trades and shall not proceed until other work and/or job conditions are as required to produce satisfactory results.
- B. The contractor shall examine the specifications for the various trades and shall thoroughly familiarize himself with all provisions regarding painting. **All surfaces that are left unfinished by the requirements of other sections shall be painted or finished as part of the work covered by this section.**

1.10 Maintenance Material

The contractor shall turn over to the Owner at the final inspection one gallon of each type and final color of the paint used on the project.

2.0 – PRODUCTS

2.1 Materials

- A. Except where otherwise specifically stated hereinafter, painting materials shall be products of one of the following manufacturers without substitution of "Equal", and shall be in that manufacturer's top grade of the respective type: Benjamin Moore, PPG, or Sherwin-Williams (Basis of Design). The term "top grade" refers to the manufacturers advertised line of best quality and not to "Professional" or "maintenance" lines. Any deviations from the requirements of this article shall only be by written change order with contract price adjusted accordingly.
- B. If job-mixed paints are used, submit proposed formulas for approval before proceeding with work. Thinning and tinting materials shall be as recommended by the manufacturer of the material used.
- C. Paints and finishing materials shall be free from skins, lumps, or any foreign matter when used, and pigments, fillers, etc., shall be kept well stirred while being applied.
- D. Interior finish materials shall comply with flame spread limitations and smoke production limitations as follows:

Walls and Ceilings - Flame Spread - 25 or less ASTM E-84.
Smoke Production - 350 or less ASTM E-84.

2.2 Colors

- A. Not limited to "stock" ready-mixed colors. Bring to directed shades or tones by mixing.
- B. In two-coat or three-coat work use slightly different colors for different coats to avoid skipping.
- C. Accent or feature areas when indicated shall be colors as selected. Color spacing and pattern shall be as indicated and/or directed. Maximum three (3) colors per area.
- D. Complete color scheme shall be as indicated on Finish Legend and Schedule.

2.3 Accessory Materials

Provide all required ladders, scaffolding, drop cloths, maskings, scrapers, tools, sandpaper, dusters, cleaning solvents, and waste as required to perform the work and achieve the results specified herein.

3.0 – EXECUTION

3.1 Workmanship

- A. Surfaces shall be clean, dry, and free of oil, grease, dirt, mildew, loose or peeling paint, loose wood particles, and in proper condition for painting. All work shall be carefully done by skilled mechanics. Finished surfaces shall be uniform in coverage, gloss, finish and color, and free from brush marks. All coats shall be thoroughly dry before applying succeeding coats.
- B. Do all work in strict accordance with manufacturer's label directions.
- C. Hand sand woodwork until smooth and free from raised grain and other surface imperfections. First coat shall be applied before erection, to all surfaces, front and back. After woodwork is primed, fill nail holes, cracks, etc., full and smooth with putty. Lightly sand between coats where necessary in accord with good practice. Fully finish the top and bottom edges of doors and other woodwork edges not normally visible. Shellac knots and pitch streaks before painting.
- D. On concrete or masonry, do no painting until the surface has dried to the equivalent of eight days drying time under well ventilated conditions in good drying weather.
- E. Vertical surfaces to Interface with suspended acoustical panel ceiling shall be primed/filled to a minimum of 8" about finish ceiling elevation prior to the installation of the acoustical panel ceiling perimeter wall edge molding/trim.
- F. Wash metal surfaces with mineral spirits to remove any dirt, grease, before applying materials. Where rust or scale is present, use wire brush, or sandpaper clean before painting. Clean shop coats of paint that become marred and touch up with specified primer.
- G. Treat galvanized metal surfaces chemically with compound designed for this purpose, apply as per manufacturer's directions before applying first paint coat.
- H. Remove and protect hardware panels, accessories, device plates, lighting fixtures, factory finished work, and similar items; or provide ample in-place protection. Upon completion of each space, carefully replace all removed items.

- I. Exterior doors shall have tops, bottoms, and side edges finished the same as the exterior faces of these doors. Interior door shall have vision windows, louvers, grilles, etc. Finished to match door frame.
- J. All closets and the interior of all cabinets shall be finished the same as adjoining room paint or stain unless otherwise scheduled. All other surfaces shall be finished the same as nearest or adjoining surfaces unless otherwise scheduled or directed.

3.2 Schedule

A. Exterior Metals

- 1. Galvanized metal shall be solvent clean with VM&P Naphtha.
Primer: S-W: Procryl B66 - 1310
Finish: Apply two coats
B66-600 Series
- 2. Non-primed metal shall be cleaned and etched with approved acid and washed with water.
Primer: S-W: Procryl B66 - 1310
Finish: Apply two coats
S-W: Pro Industrial DTM Acrylic Coating
- 3. Primed metals shall be inspected, scuffs, and abrasions sanded free of rust and receive full coat of primer. Concealed metal surfaces shall be spot primed.

Primer: S-W: Procryl B66 - 1310
Finish: Apply two coats
S-W: Pro Industrial DTM Acrylic Coating

B. Interior Metals

- 1. Non-primed metal shall be primed under this section.
Primer: S-W: Procryl B66 - 1310

Finish: Apply two coats
S-W: Pro Industrial DTM Acrylic Coating, Gloss
- 2. Primed metal shall have scratches and abrasions sanded free of rust and receive one full coat of primer.
Primer: S-W: Procryl B66 - 1310

Finish: Apply two coats
S-W: Pro Industrial DTM Acrylic Coating

- C. Exterior Ground Mount and Roof Top Mechanical Units, Equipment and Accessories. Painting contractor shall examine the site and all drawings and provide one (1) heavy coat of paint for each unit. Provide also one (1) coat primer for galvanized and/or rust areas.

D. Exposed Ceiling Painting (Dryfall)

- Primer: Pro Industrial Pro-Cryl Primer (1 coat)
Finish: Waterborne Acrylic Dry Fall Flat (1-2 coats)
B42W00001

3.3 Material Application

- A. All materials shall be applied in complete accordance with manufacturer's printed instructions.
- B. All coats shall be thoroughly dry before the succeeding coat is applied.

END OF SECTION

1.0 - GENERAL

1.1 Scope

The work required under this section consists of room/wall/ signs and building plaque(s).

1.2 Existing Conditions

- A. It is the general contractor's responsibility to field verify existing signage before a bid and provide signage that shall match all existing signage types and styles currently installed to provide a continuity of design to the owner as required.

1.3 Submittals

- A. Submit a sample of signs, including size, lettering style, materials, and finish.
- B. Provide mounting templates.
- C. Signs shall conform to requirements as set forth by the AMERICANS WITH DISABILITIES ACT Accessibility Guidelines.
- D. Submit the schedule indicating each room name and number indicated on Architectural Drawings with a corresponding space for the Owner's mark-up for the actual room name and number per school system of each room name and number along with sign type to the Architect for review.

2.0 – PRODUCTS

2.1 Manufacturers

Subject to compliance requirements. Provide products by the following

1. Leeds Architectural Letters, Inc. (Basis Of Design)
2. Devaney Sign Service, LLC
3. Bellco Sign & Engraving Specialists

2.2 Room and Wall Signs

- A. Provide photopolymer signs with Grade II Braille 3/4" numerals and 5/8" Letters to comply with ADA (American Disability Act). Signs shall be color selected from the manufacturer's full line of colors.
- B. Room signs with message insert to have 1/16" front plate, minimum 1/32" solid spacer (no tape spacer), and 1/8" back plate.
- C. Room Signs (no message slot)- minimum 1/8" thick with 1/32" raised letters.
- D. Exterior Signs - Exterior Aluminum .040 thick, factory painted, and text to be silkscreened or inkjet print.
- E. Edge Condition - Square Cut.
- F. Corners - Round.
- G. Mounting:
 1. Signs to be mounted with screws and anchors if specified.
 2. Signs mounted on wall adjacent to latch side of door 60" from floor to centerline of signs and 2" from edge of door frame to edge of sign.
- H. Typical Signage Guidelines

1. All Offices, Classrooms, and Instructional Areas shall be 6" x 8" with 2-1/2" x 8" changeable clear message insert.
2. 6" x 6" tactile exit sign at all interior exit doors leading directly to the exterior with raised copy and Braille.
3. Provide Exterior Signs (nominal 12" x 12") at all exterior entrances. Provide mounting as recommended by manufacturer. Exterior sign graphics to be provided by Architect.

3.0 - EXECUTION

- 3.1 Installation of Signs
Install signs on surfaces and at heights as directed.

END OF SECTION

1.0 -GENERAL

1.1 Scope

The work required under this section consists of custom engraved Information Plaque(s) to indicate pertinent roofing or re-roofing information on the actual roof site for the Owner's future use.

1.2 Submittals

Submit a full scale graphic representation of the proposed Information Plaque(s) for the Architect's approval.

2.0 - PRODUCTS

2.1 Information Plaque

A. Provide one Information Plaque at each distinguishable area of new roofing being provided under this contract as follows:

1. Size: 3 ½" x 7" (min.)
2. Material: 1/8" thick aluminum
3. Finish: Match roof edge metal
4. Text: Deep Engraved and painted to contrast
5. Font: ¼" (min.) Romans
6. Minimum Information:
 - a. Date - Substantial Completion / Start of Warranty
 - b. Owner / Architect
 - c. General Contractor
 - d. Roofing Sub-Contractor
 - e. Roof System Manufacturer
 - f. Description of roofing system / type
 - g. Warranty period / information

3.0 - EXECUTION

3.1 Mounting

- A. Provide Information Plaque with 3/32" mounting holes at opposite ends.
- B. Permanently attach to building features so as not to cause leaks at each distinguishable field area of new roof work. Preferably at the north or northeast perimeter edge; otherwise consult the Architect.
- C. Locate to be visible from atop the roof only and close to new work so as to not mistake the area being identified; 8" minimum above the finish roof surface.

END OF SECTION

1.0 - GENERAL

- 1.1 Scope
The work of this section consists of furnishing and installing complete, all miscellaneous furnishings and fixture items as indicated.
- 1.2 Submittals
Shop drawings shall be submitted.
- 1.3 Warranty
Provide Manufacturer's Standard Warranty where manufacturer warrants that the Goods delivered hereunder shall be of the kind described within this agreement and free from defects in material and workmanship under conditions of normal use for a period of six (6) years. Halotron, CO2 and Water/Water based extinguisher will be warrantied for a period of five (5) years.

2.0 - PRODUCTS

- 2.1 Fire Extinguisher Cabinets (FEC)
Recessed or semi-recess U.L. approved baked enamel 18 gauge steel cabinet, 24" h. x 10-1/2" w. x 6" d. with 2-1/2" trim. Cabinet door to be baked enamel or epoxy coated with stencil lettering "Fire Extinguisher" equal to J. L. Industries-Panorama #1017 Identity Q horizontal, white w/red letters - type break glass w/cly. lock; Larsen's Mfg. Co.; Amerex Corporation; or approved equal.

Provide comparable fire rated fire extinguisher cabinets in fire rated walls as per rating indicated.
- 2.2 Fire Extinguisher (FE)
 - A. Cabinet Mounted - U.L. approved, 10 pound, tri-class dry chemical for Class A, B, & C fires. Equal to J. L. Industries - Cosmic 10E with hose; Larsen's Mfg. Co.; Amerex Corporation. Provide one with each cabinet.
 - B. Wall Mounted - 10 pound, Tri-Class Dry Chemical for Class A, B, C fires, U.L. approved, Model 10 ABCS-1. Manufacturers: J.L. Industries, Larsens, Amerex Corporation.

3.0 - EXECUTION

- 3.1 Installation
Installation of all items shall be in full conformity with manufacturer's specifications, recommendations, ADA and approved details.
- 3.2 Fire Extinguishers shall be cabinet mounted in areas as indicated. Height shall be 4' from floor to extinguisher handles.
- 3.3 Fire Extinguishers shall be wall mounted in areas as indicated or required so that distance of travel between units does not exceed 75 feet. Each separate area shall have a minimum of one unit. Mounting height shall be 4' from floor to handle.

END OF SECTION

1.0 - GENERAL

1.1 Scope

The pre-engineered steel building package shall consist of primary and secondary structure, metal roof panel or deck, exterior wall cover, fascia panel, trim and flashing, closures, caulking, fasteners and other miscellaneous metal building components or accessory items as shown or called for in the drawings or specifications and as required.

1.2 Qualifications

- A. A complete structural analysis of the design is to be made to demonstrate that requirement of design and load criteria are met.
- B. A copy of manufacturer's calculations and analysis shall be furnished to the Architect.
- C. Metal building manufacturer shall be accredited by the International Accreditation Services' IAS Accreditation for Inspection Programs for Manufacturers of Metal Building Systems (AC472).
 - 1. Metal Building Manufacturer shall be currently enrolled in an IAS accreditation program and shall maintain such throughout the course of the project.
 - 2. Manufacturer Qualifications: Not less than 5 years experience in the actual production of specified products.
 - 3. Member of the Metal Building Manufacturer's Association (MBMA).
 - 4. Primary manufacturer of frames, secondary steel, roof and wall sheeting, and trim.
- D. Installer Qualifications - Firm experienced in application or installation of systems similar in complexity to those required for this project, plus the following:
 - 1. Acceptable to or licensed by manufacturer. (Provide documentation prior to start of work)
 - 2. 3 years experience with systems. (Minimum)
 - 3. Successfully completed not less than 5 comparable scale projects using this system
- E. Metal building shall be designed in accordance with "The Metal Building Manufacturers Association's Design Practice Manual."
- F. The metal building design engineer is responsible for the complete design of the metal building system.
- G. The erector shall have attended quality control training that is provided by or approved by the metal building supplier for erection of the metal building that is being supplied for the project
- H. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Finish areas designated by Architect.
 - 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.

3. Refinish mock-up area as required to produce acceptable work.

1.3 Submittals

- A. Shop Drawings for approval. Drawings and design analysis shall bear the seal of a registered professional engineer registered in the State of Alabama. The submittal shall include layout of all members, connections, calculations and analysis stamped and signed by licensed engineer, accessories and associated details for erection.
- B. Documentation of manufacturer's current (up to date) IAS certification shall be submitted to the Architect. If accreditation expires during the course of the project renewed certificate shall be submitted as well.
- C. Record or certificate of erector training for metal building system being erected.
- D. Building exterior components samples.
- E. Color samples for approval.

1.4 Warranties

All materials and workmanship covered by this section shall be guaranteed from date of final acceptance of the Contract, or from occupancy of the building whichever is earlier.

- A. Panels
All wall panels shall be guaranteed by the manufacturer against chalk, fade, crack, check, blister or peel. 35 year (PVDF)
- B. Roof Warranty
All roof panels shall be guaranteed by the manufacturer against chalk, fade, crack, check, blister, or peel. 35 year (PVDF)
Provide 20 year weathertightness warranty.

Standard manufacturer's roofing guarantees which contain language regarding the governing of the guarantee by any state other than the State of Alabama, must be amended to exclude such language, and substituting the requirement that the Laws of the State of Alabama shall govern all such guarantees.

1.5 General

- A. All components including, but not limited to the following will be furnished and installed for the complete steel structural framework: anchor bolts, wall and roof panels, downspouts, gutters, fascias, insulation, all necessary closures, trims, flashing and fasteners to provide a weather proof building, and miscellaneous accessories as specified.
- B. All steel shall be new, clean and straight. Welding shall be done by qualified operators and the specifications of the American Welding Society adhered to. Workmanship on all parts will be equal to that of best modern shop practices.
- C. Walk-thru doors and hardware furnished and installed under Hollow Metal Doors and Frames - Section 08110 And Finish Hardware - Section 08710.

- D. Pre-Installation Conference: Hold conference at Project site. Conference shall be attended by a representative from the metal building supplier, Contractor's Project superintendent, testing and inspection agency, and the metal building erector. Discuss sequencing and process of erection and coordination with other trades. Discuss testing and inspection procedures and coordination of construction activities to facilitate required testing and inspection.

2.0 - PRODUCT

2.1 General - Building Systems

- A. All structural mill sections or welded up plate sections shall be designed in accordance with the AISC "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings", latest edition.
- B. All Cold-formed steel structural members shall be designed in accordance with the AISI "Specification for the Design of Cold-formed Steel Structural Members", latest edition.

2.2 Design Loads

- A. The design loads for the building shall be, in addition to their own dead load, the live, wind, snow and seismic loads required of the following as specified:
 - 1. 2021 International Building Code.
 - 2. Low Rise Building Systems Manual, by the Metal Building Manufacturers Association.
- B. The building components shall be designed to meet the most severe conditions of load combinations set by the specified building code, but in no case be less than that produced by the following load combinations:
 - 1. Building dead load plus roof live load (or snow).
 - 2. Building dead load plus wind load.
 - 3. Building dead load plus wind load plus one-half roof snow load.
 - 4. Building dead load plus roof snow load plus one-half wind load.
- C. Roof live and snow loads shall be applied on the horizontal roof projection. Wind loads shall be assumed to act horizontally and shall be applied as pressure and suction perpendicular to the building surface.
- D. Design load requirements shall be determined by local conditions, applicable codes, building end use, etc. Application of design loads shall be in accordance with the Design Practices sections of the Metal Building Manufacturers Association (MBMA) Building Systems Manual, unless specified otherwise. NOTE: See all drawings for additional point loading on the roof structure (including but not limited to roof top mechanical units, hanging equipment loads, continuous heavy piping loads, etc.).
- E. Minimum design collateral loads supported on or hung from the roof structure shall be as follows:

Minimum Design Collateral Load (MDCL) as indicated on Structural Drawings.

These collateral loads shall be applied in addition to self-weight of building frame, roof decking and roof covering weights.

- F. Deflection Limits:
- Roof Purlins and Rafters: DL Span/360, LL Span/360, TL Span/240.
 - Girts Supporting Metal Panels: Horizontal deflection Span/120.
 - Overall Building Drift: H/200 where "H" is the building eave height.
 - Note specific deflection requirements and expansion joints noted on drawings.

2.3 Primary Framing Steel

- A. Steel for hot-rolled structural sections shall conform to the requirements of ASTM specification A 36.
- B. Steel for all built-up sections shall meet as applicable the physical and chemical properties of ASTM A 572 modified to 55,000 psi minimum yield and 70,000 psi minimum tensile strength, or ASTM A 607-85, Grade 55, or ASTM A 570-88, Grade 55.
- C. Steel for all endwall "C" sections shall meet the physical and chemical properties of ASTM A 570-88, Grade 55.
- D. Rigid Frame: All rigid frames shall be welded, built-up "I" sections. The columns shall be straight or sloped with a minimum depth of 12" for primary frame members. Bases of frames are to be pinned.
- E. Endwall Frames: All endwall roof beams and endwall columns shall be cold-formed "C" sections, mill-rolled sections, or built-up "I" sections as required for future bay addition.
- F. Plates, Stiffeners, etc.: All base plates, splice plates, cap plates, and stiffeners shall be factory welded into place on the structural members.
- G. Bolt Holes, etc: All base plates, splice plates and flanges shall be shop fabricated to include bolt connection holes. Webs shall be shop fabricated to include cable brace or rod brace holes and flange brace holes.

2.4 Secondary Framing Steel

- A. Steel used to form purlins, girts, eave struts and "C" sections shall meet the physical and chemical properties of ASTM A 570-88, Grade 55.
- B. Steel used to form zinc-coated (galvanized) rolling service door frames shall meet the physical and chemical properties of ASTM A 446-87, Grade D and G 90 Coating designation as described in ASTM A 525-87.
- C. Purlins and Girts: Purlins and girts shall be cold-formed "Z" or "C" sections with stiffened flanges. They shall be prepunched at the factory to provide for field bolting to the primary framing. They shall be simple or continuous span as required by design.
- D. Bracing Struts: Provide bracing struts of round HSS or pipe sections sized as required to transfer lateral forces into primary structural frame system.
- E. Eave Struts: Eave Struts shall be unequal flange, cold-formed "C" sections.
- F. Base Angle: A base member will be supplied by which the base of the wall covering may be attached to the perimeter of the slab. This member shall be secured to the concrete slab with concrete anchors.

2.5 Bracing

- A. Diagonal Bracing: Diagonal bracing in the roof shall be used to resolve horizontal loads (wind, seismic, crane, etc.) from the roof structure into the longitudinal bracing frames or transverse rigid frames. This bracing will be furnished to length and equipped with bevel washers and nuts at each end. It may consist of rods threaded each end or galvanized cable with suitable threaded end anchors.
- B. Flange Braces: The compression flange of all primary framing shall be braced laterally with angles connecting to the webs of purlins or girts so that the flange compressive stress is within allowable limits for any combination of loadings.
- C. Longitudinal and Special Bracing: **Diagonal bracing is not permitted in the sidewall**, a rigid frame type portal with pinned bases must be used. Coordinate load path of sidewall bracing frames with load path of wind/seismic bracing in the roof. Provide additional bracing as required to transfer all horizontal loads into the primary structural system.
- D. Coordinate trades with locations of bracing. Bracing shall not be removed or cut to facilitate installation of other trades unless approved in writing by the metal building design engineer.

2.6 Connections

- A. All field connections shall be bolted (unless otherwise noted).
- B. All shop connections shall be welded using either submerged or shielded arc process, and welding shall be in accordance with the applicable sections, relating to design requirements and allowable stresses, of the latest editions of the American Welding Society "Structural Welding Code."
- C. Metal building designer shall size anchor rods and provide details for required anchorage to the foundations.

2.7 Roof Covering

- A. The roof system shall carry a UL wind uplift Class 90 rating. Comply with FM I-90 and the 2021 International Building Code.
- B. Purlins shall be insulated so as to eliminate "thermal short circuits" between purlins and roof panels, with continuous thermal spacer blocks.
- C. Roof to be Standard 16" loc-seam panel roof in colored finish in 24 gauge material. These standing seam roof panels offer a flat profile with minor striations as a standard or optional pencil ribs for an attractive appearance on higher pitched roofs. Loc Seam panels are seamed electrically and Loc Seam 360 panels have full 360 degree rolled seams formed with an electrical seaming machine. Minimum roof slope for the Loc Seam/Loc Seam 360 roof panels is ¼ to 12. Loc Seam panels are available in 24 or 22 gage 50,000 psi in either G90 zinc-coated (galvanized) steel or aluminum-zinc alloy-coated (AZ50 or AZ55) steel. Pre-painted panels have PVDF finish. Panel clips for the Loc Seam panels are two part assemblies. The tab portions are a nominal 2-3/8" or 3-1/8" (for thermal blocks) in height and 3" in width, die formed 24 gage aluminum coated steel. The bases are die formed 18 gage zinc-coated (galvanized) steel. Expansion capability is 1-1/4". Loc Seam panel sidelaps have factory applied mastic, SikaLastomer-511 or equal. Its composition is 85% solids by weight. Service temperature range is -60°F to + 220° F. Endlaps, roof flashing laps, ridges, and eave closures are sealed with tape mastic, Sika Sika-Tape TC-95 or equal. The material is non-staining, non-corrosive, non-toxic and non-volatile. Composition is 100%

solid isobutylene tripolymer tape. Service temperature is -60°F to + 212° F.

1. Caulk: Eaves, endlaps, ridge and eave closures are sealed with non-skinning butyl caulk, SikaLastomer-511 or equal. Its composition is 85% solids by weight. Service temperature range is -60°F to + 220°F. All gutter and downspout joints, and roof accessories are sealed with polyurethane caulk, Sika SikaFlex 219LM or equal. It meets or exceeds Federal specification TT-S-00230C, Type II, Class A.
All fasteners for panel to secondary framing and panel to panel will be one of the following EPDM washer head screws.
2. Fasteners: Roof fasteners shall be No. 14 x 1" self-drilling carbon steel screws with a molded zinc alloy hex washer head.
Loc Seam panel clips are attached to the purlins with self-drilling carbon steel screws No. 12 x 1-1/4" hex head, cadmium or zinc plated.
Maximum "over the purlin" insulation thickness allowed with these panels is 4" without thermal blocks and 8" with thermal blocks and tall clips.

- D. The Loc Seam panel has received a Class 90 Wind Uplift rating by Underwriters Laboratories when tested in accordance with test procedure UL 580. The Loc Seam roof panel has been tested in accordance with ASTM E1592 and CECS 07416. This panel has also been tested in accordance with Air Infiltration, ASTM E1680, ASTM E283 and Water Penetration, ASTM E1646, ASTM E331. This panel has received a Class A fire rating when tested in accordance with test procedure ASTM E108.
The Loc Seam 360 panel has received a Class 90 Wind Uplift rating by Underwriters Laboratories when tested in accordance with test procedure UL 580. The Loc Seam 360 roof panel has been Factory Mutual and Miami-Dade County approved and also tested in accordance with Wind Uplift ASTM E1592 and CECS 07416. This panel has been tested in accordance with Air Infiltration, ASTM E1680 and Water Penetration, ASTM E1646. This panel has been approved for SREF (SSTD-97) Impact Testing. This panel has received a Class A fire rating when tested in accordance with test procedure ASTM E108.
- E. Installation - Panels are joined at the sidelap with an interlocking seam. Panel sidelaps are seamed by a special electrical seaming machine. Sidelap sealer is factory applied. Roof systems are installed by American Buildings Company Authorized Builders. Installation may be incorporated with a light gage structural system.
- F. Warranty – Provide manufacturer's Thirty-five year material and twenty year weather tightness warranties.

2.8 Wall Covering

The Exterior wall covering shall be first quality 24 gauge galvanized steel architectural type panels (A.S.T.M. Galvanized Specifications). Panels will be precision roll-formed 36" panels with ribs at 12" o.c. The interior liner panels shall be minimum 3/4" thick 24 gauge - panel profile to be approved by architect. Color to be selected by Architect.

2.9 Panel Fasteners

Panel fasteners will be galvanized self-tapping hex head screws. A self sealing washer will be used under the head of all panel fasteners. Galvanized screws will be used on the sidewalls of all colored buildings. Fasteners shall be pre-finished to match wall panel color.

2.10 Weather Sealing

A. Sealant

Sealant to be used in all end panel laps on roofs and all other locations recommended by the manufacturer or required for weathertightness.

- B. Weather Seal Strips
Sealer strips to be moulded from first grade high quality polyurethane to ensure long life.
- 2.11 Paint
- A. Exterior Paint (For Exterior Wall Panels)
A 70% minimum Kynar 500 finish shall be applied over galvanized steel and shall be given a chemical conversion treatment prior to painting. Color to be selected by Architect.
- B. Structural Paint
1. All fabricated structural steel to be shot blast cleaned to remove loose rust, mill scale, etc. After inspection for accuracy of fabrication, it shall receive one shop coat of manufacturer's standard gray finish.
2. Any field touch-up necessary shall be the responsibility of the erector.
- 2.12 Gutters, Downspouts, and Flashings
- A. Gutters and Downspouts: Gutters and downspouts to be furnished by Metal Building Manufacturer. Members to be fabricated from galvanized steel with supporting brackets properly spaced. Gutters shall be 24 gauge and downspouts 28 gauge. Finish shall match roof/wall panels.
- B. Flashings: Roof, gables and eaves will be flashed with 26 gauge galvanized fascia trim. Corners of the building will be provided with 26 gauge galvanized steel corner trim. Door, window and sill trim will be provided in 26 gauge galvanized steel. Painted galvanized steel flashings will be fabricated from prefinished steel using the same paint specifications as wall and roof sheets.
- 2.13 Insulation
See Section 07213. All insulation shall be protected and maintained dry. Wet Insulation shall be rejected.
- 2.14 Framed Openings This contractor to provide framed openings with pre-finished flashing to accommodate mechanical equipment such as louvers, grilles, piping, conduit furnished by other trades.
- 2.15 Roof and Wall Penetrations
All roof penetrations shall be flashed by building manufacturer/installer. All circular roof penetrations shall be made of a one piece construction from an EPDM membrane with aluminum base. Roof curbs shall be provided by building manufacturer/installer.

3.0 - EXECUTION

- 3.1 Erection
All components herein specified and indicated shall be furnished and erected in accordance with details and manufacturer's instructions. Erection shall be performed by a qualified erector who has attended training by the building manufacturer of the system being installed using proper tools and equipment. It shall be the responsibility of the erector to comply with all applicable legal and safety requirements. It shall further be the responsibility of the erector to determine and provide any and all temporary bracing, bridging, blocking, shoring, and/or securing of

components, etc. as required for stability during the entire erection process.

3.2 Coordination

All components herein specified and indicated shall be coordinated with other trades that effect components including but not limited to the following:

- Concrete – Section 03300
- Hollow Metal Frames - Section 08110
- Finish Hardware - Section 08710
- Mechanical - Division 15
- Electrical - Division 16

END OF SECTION

PRE-CONSTRUCTION CONFERENCE CHECK-LIST

Project: Butler Building for Surplus – Wallace Drive Campus

Funding: Local

Location: TBD

Date/Time: TBD

Please note that all items listed below may not be applicable to this project.

1. **Introductions / Sign In**

2. **Owner's Comments**

3. **Preface / Pass Along To Others**

4. **General Contractor's Team Members (contact information)**

Project Manager: _____

Superintendent: _____

5. **Verify all alternates accepted.**

6. **E-Verify. Alabama Immigration Law. Be sure that all subcontractors comply with E-Verify requirements.**

7. **List of Sub-Contractors, submit for approval.**

A Complete list of sub-contractors must be submitted and approved by the Architect and Owner prior to any work commencing. Contractor cannot replace subs unless approved by the Architect and Owner.

8. **Cost Breakdown and Progress schedule.**

Cost breakdown and progress schedule must be submitted and approved on proper ACCS forms prior to first pay request. **GC is required to provide an updated progress schedule at each OAC.**

Start:

Completion Date:

Days:

9. **Method of approving monthly pay request.**

Five original sets are required. Architect will verify, sign and forward to Owner.

10. **Allowances.**

A. With the exception of quantity allowances, all allowances indicated are contingency allowances and therefore the Owner may transfer balances for other discretionary uses. Overhead and profit margins SHALL NOT BE ADDED to any amount drawn from original Allowance(s) regardless of the indicated use.

B. Each contingency allowance shall be a "line item" on the Schedule of Values.

C. The following allowance(s) are a part of this project:

- -
 - D. If applicable, note special material/equipment delivery dates associated with allowances.
 -
- 11. Change Orders Requests. No work prior to final approval; Architect can approve in writing if emergency.**
- A. All changes in work are to be submitted via Change Order Request, regardless of monetary value.
 - B. COR's must be submitted in sequential order on GC letterhead.
 - C. All COR's must be broken down to the fullest degree, including breakdown of GC's cost by GC's labor, materials, subcontractor, sub-subcontractor cost and OH&P. Subcontractor and sub-subcontractor cost must be documented with copies of quotes detailing OH&P included.
 - D. COR's applied to allowances cannot include OH&P.
 - E. Credit COR's must include a minimum of 5% OH&P.
 - F. Upon Owner and/or Architects' approval of COR's, a revised Change Order and Allowance Usage log will be sent to GC via email.
 - G. GC is to maintain a COR Log and present updated copy at each OAC meeting.
 - H. **NOTE: The following information is required for ALL Change Order Requests submitted:**
 - a. Each material number shall include an invoice / quote listing unit quantities, unit price, and extended total.
 - b. Each labor number shall include a breakdown showing number of laborers, hours of labor worked, hourly wage, and extended total.
 - c. Each equipment number shall have an invoice / quote listing the hours of use, hourly rate, and extended total.
 - I. An official Change Order to the State **CANNOT** be prepared if all backup paperwork is not accounted for.
 - J. This information is required for all contractors, subcontractors, and sub-subcontractors.
- 12. Shop Drawings.**
- A. Submittal Schedule must be submitted to Architect at or before Pre-Construction Conference. Correlate this submittal schedule with the listing of subcontractors and with list of materials as specified in contract documents. The submittal schedule should be in chronological order following the critical timing of the approval of submittals in accordance with the Work Progress Schedule.
 - B. Submit all items proposed for use in work. Do not combine submittals with requests for substitutions
 - C. Must bear GC's action stamp as APPROVED OR APPROVED AS NOTED. Contractor shall review and stamp approval and submit shop drawings, product data and samples far enough in advance to allow ample time for Architect review. Color selections may take longer than actual submittal approval, but in any case will not be given via phone calls. If submittals are not marked as approved by the GC, they will be returned without action.
 - D. Digital Copies: Provide via email to submittals@lathanassociates.com. Do not send directly

to Architect. **See attached Sample.**

E. Submittal Preparation:

- **Include the following information on transmittal / email.**
 - Date
 - Project Name and Architect's Project Number.
 - Name of the General Contractor and Contact within company.
 - Subcontractor/Supplier.
- Clearly state **Number** and title of appropriate Specification Section and **Description** of Item and if applicable
 - Name of the Manufacturer.
 - Model / Style of Item
 -

General Contractor must review and approve shop drawings and submittals prior to submitting to Architect. Allow the Architect no less than three (3) weeks for initial review. Allow more time if the Architect must delay processing to permit coordination with the sequence of construction, related specification divisions, engineers, consultants and owner's representatives. Allow no less than two (2) weeks for reprocessing.

NOTE: No extension of Contract Time and/or additional costs will be authorized because of failure to transmit submittals sufficiently in advance of the Work to permit processing.

- F. Material shall not be fabricated or work performed without approval of respective submittal.
- G. GC is to maintain copies of all approved shop drawings at the site and have available for architect and/or engineers at all times.
- H. **GC is to maintain a Submittal Log and present updated copy log at each OAC meeting.**
- I. **Important:** Contractor shall perform no portion of the work for which the contract documents require submittal and review of Shop Drawings, Data, Installer Qualifications, etc. until respective submittal has been approved by the Architect.
- J. **Important:** Submittals are not Contract Documents and are not used to make changes in scope of project or intent of Contract Documents, and not used to request or IMPLY substitutions or to otherwise make changes in project requirements.
- K. **Important:** The only changes that can be made to the project once it is bid, is through Change Order Requests and Approvals.
- L. **Important:** After receiving approved digital submittals, General Contractor is responsible for printing and delivering 2 hard copies of the approved shop drawings to the Architect within 10 days. Submittals are not considered complete until 2 copies have been received by the Architect. This may have a direct effect on pay requests or final payment.

13. **CAD Files / PDF**

- A. This project was bid under the assumption that electronic CAD files would not be available.
- B. Electronic CAD files are owned individually by each design professional according to discipline. If electronic CAD files or portions thereof are made available, be reminded that electronic CAD files can be manipulated and do not constitute the Contract Documents. The business of acquiring such files shall be between the contractor and the individual design professional. Fees may or may not be applicable. It shall be the Contractor's responsibility to investigate and procure at no added expense to the Owner.
- C. PDF files shall be made available to the General Contractor for use during construction.

14. **Advanced notice of required inspections.**

The contractor will contact the architect by e-mail at inspections@lathanassociates.com of the date the project will be ready for an inspection by the Inspector: Pre-Roofing, Fire Above Ceiling, Final, and Year End. Special Inspections shall be required for all work of the Storm Shelters and the Fire Water Lines. Schedule well in advance to prevent delays.

- Inspections must be requested 14 days in advance.
- When the Inspector confirms the inspection time, the Architect will send an e-mail confirming the inspection time and date.
- Cancellations of any scheduled inspection must be received in writing by e-mail no less than 48 hours prior to the scheduled inspection. If an inspection is cancelled, it will be rescheduled subject to the Inspector's availability.
- If an inspection is cancelled less than 48 hours prior to the scheduled inspection, the re-inspection fee of \$1,500 will be charged.

15. Inspection Minimum Requirements.

The following minimum requirements listed below are provided to aid the contractors and architect in determining if a project is ready for a required inspection.

- Pre-Construction Conference
 - Required Attendees: Contractor, Owner, Architect, Major Subcontractors
 - Inspection Requirements:
 - ✓ Signed construction contract
 - ✓ Fire Alarm Contractor's Certification (from State Fire Marshal)
 - ✓ ADEM permit, if more than 1 acre of land is disturbed
- Pre-Roofing Conference
 - Required Attendees: Contractor, Owner, Architect, Roofing Subcontractor, Roofing Manufacturer's Representative
 - Inspection Requirements:
 - ✓ Roofing submittals must be approved by the architect prior to pre-roofing conference
 - ✓ Roofing manufacturer must provide documentation that roof design and roofing materials meet code requirements for wind uplift and impact resistance
 - ✓ Copy of sample roofing warranty
- Above-Ceiling Inspections
 - Required Attendees: Contractor, Owner, Architect, MEP Engineers, Major Subcontractors, Inspector
 - Inspection Requirements:
 - ✓ All work must be completed except for installation of ceiling tiles and/or hard ceilings
 - ✓ Space must be conditioned
 - ✓ Permanent power must be connected unless otherwise arranged with the Inspector
- Life Safety Inspections and Final Inspections
 - Required Attendees: Contractor, Owner, Architect, Engineers, Major Subcontractors, Local Fire Marshal, City Inspector
 - Inspection Requirements:
 - ✓ Fire alarm certification
 - ✓ General Contractor's 5-Year Roofing Warranty (ACCS Form 6-L)
 - ✓ Roofing manufacturer's warranty
 - ✓ Emergency and exit lighting tests
 - ✓ Fire alarm must be monitored

✓ Must have ADA access completed

- Year-End Inspections

- Required Attendees: Contractor, Owner, Architect, Engineers and /or Major subcontractors may also be required to attend
- Inspection Requirements:
 - ✓ Owner's list of documented warranty items

16. Above Ceiling Inspection by the Architect, Engineers and Inspector.

No above ceiling work is to be done after the Above Ceiling Inspection other than correction of deficiencies noted during the inspection. (Pre-Above Ceiling Inspection)

Fire Caulking Tented fixtures Wire at Light Fixtures Debris
Temporary Lighting Penetrations Pipe Saddles

Insulation - No Kraft - Exposed Fire-Rated FSK or FRK - Type III, Class A.

17. Other inspections required before work is covered.

- A. Local inspectors may require a full range of inspections on this project, footings, under-slab, etc. A wall inspection will be held before any finish paints are applied.
- B. Material testing.

18. Observation report distribution.

Architect will submit field reports promptly to the Owner and GC. Architect will fill in all blanks on the field report form.

19. Record drawings, definitions of procedures.

G.C. is to keep all changes made in the field red lined daily. Cut and paste all addendums onto the plans at their respected locations. One clean set of plans is to be secured at the job trailer at all times for review by all interested parties. This set with changes could be used as the record drawings. Final pay approval is subject to receipt of these as-built drawings.

20. Project sign and other job signs.

State required sign is the only sign allowed on project.
Job trailers with contractor and/or sub-contractor names are allowed.

21. Overall phasing of project.

Superintendent is responsible to plan ahead in order to avoid delays and conflicts. GC is to advise Architect on delays of critical path items. Superintendent is to be on site at all times when any work is in progress; no exceptions (GCS 6A & B)

22. Contractor's duty to coordinate work of separate contractor.

Contractors employed by others for installation of data, computer and etc. (GCS 40D)

23. Use of existing site, building and access drive.

- A. Use of existing building site for lay down is to be determined by local owner and Architect. Local owner will advise contractor on proper route to site. Material delivery times are to be made as to not interfere with the school bus schedule. Area is to be reviewed after this meeting, if necessary. Maintain traffic flow.
- B. No workmen are allowed in existing building, unless prior approval is granted by the Owner and arranged by the General Contractor. There is to be no communication between workers and faculty/staff or students; through vocal, looks, stares or body language.
- C. Since most projects are hard hat areas, the worker's name will be on his/her hat for identification purposes.
- D. If a faculty/staff member or student is causing a problem with a worker, the worker is to

report the incident to the Project Superintendent. The Superintendent should then report the incident to the Owner. Under no circumstances should the Worker try and handle the problem by him/herself.

- E. There is to be no profanity on the job site.
 - F. School Lunchroom is off limits to workers.
 - G. Use of existing site, building and access drive.
 - H. Workmen are expected to dress appropriately. Tee-shirts are expected to be non-offensive to all parties.
 - I. State school properties are tobacco free areas. No smoking, chewing, or dipping of tobacco products are allowed.
 - J. State school properties are drug free areas. Vehicles are subject to search and seizure by law enforcement authorities.
 - K. Firearms are not allowed on school property. Cased, uncased, loaded, or unloaded.
24. **Use of existing toilets.**
There will be no use of existing toilets. G.C. is to provide proper number of toilets for all workers. School telephone is off limits.
25. **Coordinate any utilities supplied by the Owner / New equipment.**
A. Existing sites, normally water only.
B. Coordination - OAC /Sub Meetings
C. New equipment utilities may be different than those existing utilities that the design is based upon. Coordinate with actual equipment cut sheets submitted and approved.
26. **Coordinate outages with Owner.**
Provide as much notice as possible. Superintendent is to verify that coolers and freezers are back on line. Coordinate with key testing date, do not disrupt on-going school operations. *Roofing fumes must be minimized with afterburner.*
27. **Keeping existing exit paths open.**
Required exits are to be maintained at all times.
28. **Routine job clean up.**
Debris is to be removed daily/weekly from building and site. Do not allow dumpster to spill over. Burning of trash on site is not allowed. (GCS 48)
29. **Safety is General Contractor's responsibility.**
As a courtesy, advise the Architect if there has been a problem.
30. **Project limits.**
Defined on drawings.
31. **Building location relative to critical property line. Easements, Setbacks, etc.**
Review with Architect before starting work.
32. **Location of property lines, corners, etc.**
Review with Architect before starting work.
33. **Verify sanitary outfall before committing to floor level.**
Plumber is to advise Superintendent ASAP and Superintendent is to notify Architect if there is a problem.

34. **Procedure if bad soil is encountered.**
Contact Architect immediately.
35. **Stockpiling top soil.**
On existing sites, location is to be approved by the Architect and Owner.
36. **Protect existing trees, shrubbery, landscaping, sidewalks, curbs and etc. that is intended to remain.**
GC is to leave existing site in same condition as when project started.
***If disturbing more than 1 acre, discuss ADEM requirements.*
37. **Soil compaction, type soil, lab test, etc.**
Testing Engineer is to approve compaction. Soil type is listed in the specs. For lab tests, refer to the specs. Testing disclosure.
38. **Soil Treatment.**
Soil treatment provider is to come to the site with empty tank. Use on site water. Superintendent is to witness the treatment container seals broken and mix prepared. No pre-mixed material is to be brought to the site.
39. **Surveyor to check foundation wall. Location is critical.**
40. **Ready mix plant, file delivery tickets, slump and cylinder test.**
Protect cylinders until tested. Superintendent is to have on file, at all times, the delivery tickets, slump and cylinder test results.
41. **Quality of concrete work. Concrete testing.**
Concrete is to be free of hollows and humps. Finish floor areas are to be no more than 1/8" in 10'. Review specs for slump requirements. Do not add water to concrete without approval of Geotechnical personnel.
42. **Materials Testing / Re-testing**
Retesting will be at Contractor's expense.
43. **Inspection before pouring concrete.**
Two (2) day notice is required before you pour footings. Architect must approve all concrete placement. Pictures are not acceptable. Prior to footing inspection, all footings will be cleaned of loose soil, debris, and water. Steel is to be properly tied and supported.
44. **What is expected of masonry work, mortar additive.**
All masonry work shall be as stated in the specs. Full head and bed bull-nose outside corners. Joints are expected on both sides of the units. Pre-formed corner tees, durowall and flashing are required. Mortar mix shall be made with same proportions everyday throughout entire project, using appropriate measuring devices. For tooling of brick or block, refer to specs. No brick or block less than a half unit is allowed at any opening. Full head weeps at 32" on center. All substandard masonry will be removed. Cull blocks; do not lay chipped blocks. Cut holes for electrical outlet boxes the proper size; caulking and oversized plates are not allowed.
45. **Problems with hollow metal (install proper fire labels).**
Do not paint fire labels. Labels will be attached; rating is to be embossed in minutes and/or hours. Specs require coating the interior of the frames. Grout frames solid.
46. **Pre-roofing conference. No roofing materials installed prior to conference.**

Contractor, manufacturer and applicable suppliers are required to be present.
Verify with DCM Inspector if underlayment installation is acceptable prior to pre-roofing conference.

47. **G.C. is to have copies of all required roofing warranties in hand at the final inspection.** i.e. Manufacturers' and Five Year warranty issued by the General Contractor and the Roofing Subcontractor, (which is to be dated the date of the substantial completion), or final cannot be held.
48. **Potential conflict of mechanical and electrical equipment.**
It is the responsibility of the GC to coordinate the installation of all equipment where a conflict may occur. G.C., HVAC, Plumbing and Electrical subs are to read their sections of specs. Each foreman is to sign their section on the master copy, which is kept in the job trailer.
49. **Problems with fire damper installations.**
Installation of the dampers will be as shown on the plans. All other installation procedures will be unacceptable.
A. Fire stop material; workmen must be certified to install firestop material. Firestop system must be a UL approved assembly. (See manufactures' manual).
B. Stencil all fire walls, both sides every 20ft.
50. **Certificate of Substantial Completion.**
Architect will provide at the final inspection, provided contractor has copies of all roof warranties and the fire alarm certification.
51. **Project Closeout Procedures / Final payment.**
A. Warranties must be effective the Date of Substantial Completion. All warranties must identify the product covered.
B. Operating and maintenance manuals. All training required for the MPE fields will be completed prior to the final request being released.
C. As-built drawings.
D. Other requirements. G.C. is to make a list of all over-stocks that are required by specs and have at final for B.O.E. signature and acceptance.
E. Final Payment. Punch list items must be completed to the Architect's satisfaction, all close out documents must be received by the Architect, all change orders must be fully executed and Certificate of Substantial Completion must be fully executed before final payment is made. (GCS, 34A & B)
52. **Advertisement of Completion. Start ad after substantial completion.**
A. 1 week for projects valued less than \$50,000.00.
B. 4 consecutive weeks for projects exceeding \$50,000.00.
C. General Contractor is responsible for placement and payment of advertisement.
53. **Time Extensions.**
The GC can submit time extension request to the Architect on a weekly basis, with reasons for extension. Delays caused by rain, must exceed the five year average. (GCS 23).
54. **Quality Control.**
Urinals 17" A.F.F. Flush valves at wide side. Rigid conduit under slab. Fire strobes 80" to bottom, within 15' of exits.
55. **Requests For Information (RFI'S)**

- A. All RFI's must be numbered and made in writing to the Architect's email rfi@lathanassociates.com by the General Contractor. Please include your name, company name, telephone number, and fax number so that we may respond appropriately. Verbal RFI's will not be answered. All RFI's must be in writing.
- B. The Architect will not accept RFI's directly from subcontractors or vendors.
- C. The Team List provided within the Specification Manual is for informational purposes only and should not be used to contact Engineers and/or Consultants directly with questions regarding the project.
- D. All questions that need to be directed to an Engineer / Consultant must be routed through the Architect's office. If applicable, the Architect will contact the appropriate Engineer / Consultant for information.
- E. Bids shall be based upon the official Contract Documents consisting of Plans, Specifications and Addenda. Architect assumes no responsibility for information used by Contractors outside the official Contract Documents.
- F. **A RFI Log shall be kept by the Contractor and reviewed at each OAC Meeting.**
It will be the contractor's responsibility to inform Architect of any outstanding RFI's in a timely manner.

56. Liquidated Damages

- a. Liquidated damages will be strictly enforced for not reaching substantial completion by the scheduled completion date. Liquidated damages will be deducted from the General Contractors final payment.