Project Manual For:

The Park Danforth
Portland, Maine

Park Danforth

Package 1: Structural Bid Set

Project 13-059-00
May 27, 2015

LAVALLEE | BRENSINGER ARCHITECTS

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SECTION 00 01 03
PROJECT DIRECTORY

OWNER

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777 Stevens Avenue, Portland, Maine 04103

ARCHITECT

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CONSULTANTS

INTERIOR DESIGNER

TMD Designs (TMD)
223 Atlantic Avenue, North Hampton, New Hampshire 03862

CIVIL ENGINEER/LANDSCAPE ARCHITECT

Mitchell & Associates Landscape Architects
70 Center Street, Portland, Maine 04101

STRUCTURAL ENGINEER

Becker Structural Engineers, Inc. (BSE)
75 York Street, Portland, Maine 04101

FIRE PROTECTION, PLUMBING, MECHANICAL, ELECTRICAL ENGINEERS

Allied Engineering
160 Veranda Street, Portland, Maine 04103

EQUIPMENT CONSULTANT

Crabtree McGrath Associates, Inc.
161 West Main Street, Georgetown, Massachusetts 01833

CONSTRUCTION MANAGER

PC Construction Company
131 Presumpscot Street, Portland, Maine 04103

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INVITATION

2.01 INTENT

A. Where the term Sub-Bidders is used, it shall be understood to mean those persons or organizations, including the Contractor's own forces where applicable, who submit prices to the Contractor for Work described in the Contract Documents.

2.02 CONTRACT TIME

A. Perform the Work within the time stated in Section 01 00 00 - General Requirements.

BID DOCUMENTS AND CONTRACT DOCUMENTS

3.01 DEFINITIONS

A. Definitions set forth in the General Conditions of the Contract for Construction, AIA Document A201, or in other Contract Documents are applicable to the Bidding Documents.

B. Addenda are written or graphic instruments, issued by the Architect prior to the execution of the Contract. They modify or interpret the Bidding Documents by additions, deletions, clarifications, or corrections. It shall be the Contractor's responsibility to distribute Addenda to the various Sub-Bidders. Addenda will become part of the Contract Documents when the Construction Contract is executed.

C. Base Sub-Bid is the sum stated in the Sub-Bid for which the Sub-Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or deducted for sums stated in Alternate Sub-Bids.

D. Alternate Sub-Bid (or Alternate) is an amount stated in the Sub-Bid to be added to or deducted from the amount of the Base Sub-Bid if the corresponding change in Work, as described in the Bidding Documents, is accepted.

E. Unit Price is an amount stated in the Sub-Bid as a possible price per unit of measurement for materials, equipment, services or a portion of the Work as described in Bidding Document. The choice of using Unit Prices, or an alternative method of payment, for additional Work shall be left solely to the Owner's discretion.

F. Sub-Bidder is a person or entity who submits a Sub-Bid to the Contractor for materials, equipment or labor for a portion of the Work.

3.02 SUB-BIDDER'S REPRESENTATION

A. Each Sub-Bidder by making his Bid represents that he has read and understands the Bidding Documents, that he agrees that the Bidding Documents are adequate to produce the required results, and that his Sub-Bid is in accordance therewith.

B. Each Sub-Bidder by making his Bid represents that he has visited and thoroughly inspected the existing building and site, and familiarized himself with the local conditions under which the Work will be performed. Sub-Bidders are encouraged to make any and all inspections and tests as they feel necessary to achieve such familiarization prior to submitting Sub-Bids. Such inspections and tests shall be conducted at times mutually acceptable to the Owner, Contractor, and Sub-Bidder. Unless waived by the Architect, Sub-Bidders shall make repairs following their testing, as necessary to restore tested areas to pre-testing condition. Should a Sub-Bidder conclude that time or other factor(s) prohibits him from performing sufficient tests, he shall so notify the Architect, in writing, prior to submitting his Bid to the Contractor.

C. The submission of a Sub-Bid will be construed as conclusive evidence that the Sub-Bidder has made all such examinations and inspections necessary for a complete and proper assessment of the Work required, and that the Sub-Bidder has included in his Sub-Bid a sum sufficient to cover the cost of all items necessary to perform the Work as set forth in the proposed Contract Documents. No allowance will be made to a Sub-Bidder because of lack of such examination, inspection or knowledge.

D. Each Sub-Bidder by making his Sub-Bid represents that he has assessed the conditions of the current construction marketplace, and verified that an adequate, experienced workforce is available to suitably man the Work of this Project, and complete it in a timely fashion.

E. Each Sub-Bidder is assumed to have made himself familiar with all Federal, State and Local laws, ordinances and regulations which in any manner affect those engaged in or upon the Work, or in any way affect those engaged or employed in the Work of the materials or equipment used in or upon the Work, or in any way affect the conduct of the Work. All taxes and assessments as levied by Federal, State and Local laws shall be applicable to this Contract.

3.03 AVAILABILITY

A. Bid documents may be obtained at the office of the Construction Manager which is located at PC Construction Company, 131 Presumpscot Street, Portland, Maine 04103, tel. 207-874-2323.

B. Bid Documents are made available only for the purpose of obtaining offers for this project. Their use does not grant a license for other purposes.

3.04 EXAMINATION

A. Each Sub-Bidder shall examine the Bidding Documents carefully.

B. Sub-Bidders are encouraged to direct any questions which may arise to the Architect, through the Construction Manager, in order to provide necessary clarifications prior to the commencement of the Work.

C. Bid Documents may be viewed at the office of Construction Manager which is located at PC Construction Company, 131 Presumpscot Street, Portland, Maine 04103, tel. 207-874-2323.

D. Upon receipt of Bid Documents verify that documents are complete. Notify Architect should the documents be incomplete.

E. Immediately notify Architect through the Construction Manager, upon finding ambiguity, discrepancies or omissions in the Bid Documents, or the site and local conditions. Should Sub-Bidders fail to notify the Architect through the Construction Manager, of discrepancies or contradictions in the Bidding Documents, they shall be assumed to have Sub-Bid the more expensive alternative.

3.05 INQUIRIES & ADDENDA

A. Requests for interpretation or correction of any ambiguity, inconsistency or error, which a Sub-Bidder may discover therein, shall be submitted to the Architect, through the Construction Manager, in writing.

B. Any interpretation or correction will be issued in writing as an Addendum by the Architect. No Sub-Bidder shall rely upon any interpretation or correction given by any other method.

C. Addenda may be issued during the bidding period. All Addenda become part of the Contract Documents. Include resultant costs in the Bid Amount.

D. Verbal answers are not binding on any party.

E. Clarifications requested by Sub-Bidders must be in writing and received by the Architect not less than 7 days before date set for receipt of bids. The reply will be in the form of an Addendum, a copy of which will be forwarded to the printing company and entities who have received documents directly from the Architect and the Construction Manager.

3.06 SUBSTITUTIONS

A. Each Sub-Bidder represents that his Sub-Bid is based upon the materials and equipment described in the Bidding Documents. Where the language "or approved equal" is used in the Bidding Documents, it is intended to require that all such materials and equipment shall be submitted as required by these Instructions to Sub-Bidders, and approved by the Architect and Owner prior to the receipt of Sub-Bids. See Section 01 60 00 - Product Requirements, for additional information and the required Contractor's Substitution Request form.

B. Each request for substitution shall include a complete description of the proposed substitute, the name of the material or equipment for which it is to be substituted, drawings, cuts, performance and test data, lists of similar successfully completed installations and references, and any other data or information necessary for a complete evaluation. A statement identifying changes in other material, equipment or other portions of the Work that incorporation of the proposed substitution would require shall also be included.

C. If a Sub-Bidder proposes to use a material that while suitable for the intended use, deviates in any way from the detailed requirements of the Contract Documents, he shall inform the Architect in writing of the nature of such deviations at the time the material is submitted for review. It shall be the responsibility of the Sub-Bidder to notify the Architect, in writing, of the presence of asbestos or any other hazardous materials in any proposed substitution. Such written notice shall be in the form of a cover letter attached to the related documents.

D. In requesting approval of deviations or substitutions, a Sub-Bidder shall provide evidence leading to a reasonable certainty that the proposed substitution or deviation will provide a quality of result at least equal to that otherwise attainable. If, in the opinion of the Architect, the evidence presented does not provide a sufficient basis for such certainty, the Architect may reject such substitution or deviation without further investigation.

E. In requesting approval of substitutions, a Sub-Bidder represents that he will provide the same warranty for the substitution that he would for that specified.

F. The Contract Documents are intended to produce a building and site improvements of consistent character and quality of design. The Architect shall judge the design and appearance of proposed substitutes on the basis of their suitability in relation to the overall

design of the project, as well as for their intrinsic merits. The Architect will not approve as equal to materials specified proposed substitutions which, in his opinion, would be out of character, obtrusive, or otherwise inconsistent with the character or quality of design of the Project.

G. The Contractor shall be solely responsible for coordinating the installation of accepted substitutions, making such changes as may be required for the Work to be complete in all respects. Any additional cost, or any loss or damage arising from the substitution of any material or any method for those originally specified shall be borne by the Contractor, notwithstanding approval or acceptance of such substitution by the Owner or the Architect, unless such substitution was made at the written request or direction of the Owner or the Architect.

H. The burden of proof of the merit of a proposed substitution is upon the proposer. Approval of a proposed substitution is valid only upon issuance by the Architect in written form and the Architect's decision of approval or disapproval of a proposed substitution shall be considered final.

I. Where the Bid Documents stipulate a particular product, substitutions shall be considered up to 7 days before receipt of Sub-Bids.

J. When a request to substitute a product is made, the Architect may, or may not, approve the substitution and will issue an Addendum to known Bidders.

K. Provide complete information on required revisions to other work to accommodate each proposed substitution.

L. Provide products as specified unless substitutions are submitted in this manner and accepted.

SITE ASSESSMENT

4.01 SITE EXAMINATION

A. Examine the project site before submitting a bid.

B. A visit to the project site has been arranged for bidders as follows: The Construction Manager will schedule site visits as required.

4.02 PREBID CONFERENCE AND SITE EXAMINATION

A. A bidders conference will be scheduled by the Construction Manager at The Park Danforth, 777 Stevens Avenue, Portland, Maine 04103. Time and date To Be Determined.

B. All subcontract bidders and suppliers are invited.

C. Representatives of Architect will be in attendance.

D. Information relevant to the Bid Documents will be recorded in an Addendum, issued to Bid Document recipients.

QUALIFICATIONS

5.01 SUBCONTRACTORS

A. Each prospective Sub-Bidder shall, if requested by the Architect, submit to the Architect a properly executed Qualification Statement on forms prescribed or approved by the Architect. Such forms shall be completed in every detail. Upon determination of the qualifications submitted, the Owner reserves the right to accept or reject a prospective Sub-Bidder. Failure to fully execute a Qualification Statement, when required, will cause the prospective Sub-Bidder to be rejected.

B. The Contractor shall submit the names of all proposed Sub-Bidders to the Owner and Architect prior to the solicitation of Sub-Bids. Submitting such a list of Sub-Bidders shall not in any way relieve the Contractor of his responsibility for their reliability and performance.

C. The Contractor shall be required to establish to the satisfaction of the Owner and the Architect the reliability and responsibility of the proposed Sub-Bidders to furnish and perform the Work pertaining to such proposed Sub-Bidders' respective trades.

D. The Owner, after due consideration will then inform the Contractor if he has reasonable and substantial objection to any proposed Sub-Bidder. If the Owner has a reasonable and substantial objection to any such Sub-Bidder, and refuses to accept such person or organization, the Contractor shall submit an acceptable substitute Bidder.

E. Sub-Bidders and other persons and organizations proposed by the Contractor and accepted by the Owner must be used on the Work for which they were proposed and accepted, and shall not be changed except with the written approval of the Owner.

F. Owner reserves the right to reject a proposed subcontractor for reasonable cause.

BID SUBMISSION

6.01 SUBMISSION PROCEDURES

A. Bidders shall be solely responsible for the delivery of their Bids in the manner and time prescribed.

B. It is the intent of this Contract that as much of the Work as practical be competitively Sub-Bid by not less than three (3) pre-qualified and Owner approved Sub-Bidders for each trade or Sub-Bid package. The Owner shall be advised in all cases when fewer than three (3) qualified sub-bidders are available for any trade or sub-bid package.

C. It is the Contractor's responsibility to organize the Sub-Bid packages in such a manner so as to optimize the ease of execution of the Work and obtain most favorable pricing for the Owner.

D. All Sub-Bids shall be delivered in a manner established in advance by the Contractor and acceptable to the Owner.
   1. All Sub-Bids shall be signed by the person or persons legally authorized to bind the Sub-Bidder to a Contract.

E. The Sub-Bidder acknowledges the right of the Owner and Contractor to reject any or all Sub-Bids and to waive any informality or irregularity in any Sub-Bid received, or to accept any Sub-Bid. In addition, the Sub-bidder recognizes the right of the Owner and Contractor to reject a Sub-Bid if the Sub-Bidder failed to submit the data required by the Bidding Documents, or if the Sub-Bid is in any way incomplete or irregular.

PERFORMANCE ASSURANCE

7.01 CONSENT OF SURETY

A. Submit with the Bid: Consent of Surety form stating the corporation, partnership, or individual, other than the Contractor who are to be holden and to stand firmly bound and obligated unto The Park Danforth (the Owner), its successors and assigns, in the sum of the applicable contract.

7.02 BONDS

A. Prior to the execution of the Contract, the selected Contractor shall furnish bonds covering the faithful performance of the Contract and the payment of all obligations arising there under. Such bonds shall be in the amount of One Hundred Percent (100%) of the Contract sum, and shall be on forms as bound in the Bidding Documents, or as approved by the Owner. The premium shall be paid by the Contractor, and the securities secured through the Contractor's usual sources as may be agreeable to the parties. The Contractor shall deliver the required bonds to the Owner not later than the date of execution of the Contract, or if the Work is commenced prior thereto in response to a Letter of Intent, the Contractor shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be issued. Bonds shall remain in effect for not less than the entire guarantee period.

B. The Contractor shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of his power of attorney indicating the monetary limit of such power.

7.03 INSURANCE

A. Prior to the start of the Work, the Contractor shall furnish insurance certificates to the Owner and Architect as required in Section 00 73 00 - Supplementary Conditions.

7.04 MISCELLANEOUS REGULATIONS

A. Attention is called to applicable Equal Employment Opportunity Provisions, Affirmative Action regulations and all requirements placed upon the Contractor there under.

7.05 SELECTION AND AWARD OF ALTERNATIVES

A. Indicate variation of Bid price for Alternatives listed on the Bid Form. Unless otherwise indicated, indicate Alternatives as a difference in Bid price by adding to or deducting from the Base Bid price.

B. Bids will be evaluated on the Base Bid price, plus consideration of Alternates and Bid Price adjustments, as determined by the Owner to be in his/her best interests.

OFFER ACCEPTANCE/REJECTION

8.01 DURATION OF OFFER

A. Bids shall remain open to acceptance and shall be irrevocable for a period of thirty (30) days after the Bid closing date.

8.02 ACCEPTANCE OF OFFER

A. Owner reserves the right to accept or reject any or all offers.

END OF INSTRUCTIONS TO SUB-BIDDERS

SECTION 01 00 00
GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. The General Conditions, Supplementary General Conditions and Special Conditions of this Contract shall apply to each and every contract and contractor or other person or persons supplying labor, material, equipment and/or services entering into this Project and/or on the premises directly or indirectly.

B. Definitions:
   1. The word “Contractor” where used throughout this document to describe the General Contractor, shall also mean the “Construction Manager”, both Contractor and Construction Manager describing the entity holding the prime Contract for Construction.

C. Work Included in This Contract:
   1. Providing all labor, materials, equipment, and services, etc., as required to properly complete all Work identified in, implied by or otherwise required by the Contract Documents.

D. Work Excluded from This Contract:
   1. Providing equipment noted as “Not in Contract” (N.I.C.) or “By Owner,” (B.O.). The Contractor shall, however, provide services and coordination related to items not in the Contract as otherwise required or implied by the Contract Documents.

1.02 GENERAL RESPONSIBILITIES OF THE CONTRACTOR

A. Regulations: The Contractor shall fully comply with all governing Local, State and Federal Laws, Codes, Rules, Regulations and Ordinances, including but not limited to The Americans with Disabilities Act, Equal Employment Opportunity and Affirmative Action provisions, and Occupational Safety and Health Administration provisions.

B. Permits: The Contractor shall obtain and pay for all permits and arrange for necessary inspections and approvals from the authorities having jurisdiction. Should any changes be necessary in the Contract Documents to secure such approvals, the Contractor shall promptly notify the Architect.
   1. For the Owner’s records, submit copies of permits, licenses, inspection reports, certifications, and similar documents, correspondence and records established in conjunction with compliance with standards and regulations bearing on the Work.

C. Coordination: The Contractor shall be fully responsible for coordinating all construction activities to assure efficient and orderly installation of each part of the Work. In general coordination duties shall include, but not be limited to verifying dimensions and existing field conditions, coordinating construction operations, establishing on-site lines of authority and communication, monitoring schedules and progress, monitoring quality, maintaining records and reports and in general assuring the proper administration of the Work.
   1. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.
   2. Where installation of a component or system involves installation of component parts by multiple subcontractors, the Contractor shall inventory, store, and distribute parts to appropriate installers.
   3. Where structural, electrical, or mechanical components such as columns, ductwork, sprinkler piping, or raceways are installed in finished spaces, the intent is for room finish to enclose such components unless indicated otherwise. Coordinate between the trades and with the Architect.

4. Where inspections or approval of a substrate or component to be concealed by another is required, coordinate construction activities and notification of Architect or inspecting party. Do not conceal substrate or component until it has been inspected and is satisfactory.
5. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for maintenance, service, and repair.
6. Make adequate provision to accommodate items scheduled for later installation.
7. Coordinate completion and clean-up of Work in preparation of Substantial Completion.
8. After Owner occupancy, coordinate access to site for correction of defective or incomplete Work to minimize disruptions to Owner's activities.

D. Supervision – Construction Superintendent: The Contractor shall place and maintain a competent, experienced construction Superintendent/Foreman in charge of the Work on the job site at all times while work is in progress, including overtime operations by the Contractor's forces or by subcontractors. No changes in this position shall be made without the Owner's prior approval. The Owner shall have the right to review the qualifications of the proposed Superintendent/Foreman and ask for a replacement if in his opinion the person does not meet the qualifications that the project will demand. The same superintendent who was in charge during the general progress of the Work shall oversee the completion of all punch list items.
   1. The Contractor shall be responsible for the strict enforcement of the following requirements:
      a. All persons working on the Project site shall be required to conduct themselves in a courteous and professional manner. The use of profane language shall be strictly prohibited.
      b. Smoking and alcoholic beverages shall be strictly prohibited on the Project site.
      c. The use of radios, headphones, etc. on site shall be strictly prohibited.
      d. Contact with building occupants and visitors shall be minimized to the extent necessary for the safe and proper execution of the Work.
      e. All construction personnel shall be issued identification badges by the Contractor, which shall be conspicuously displayed at all times while on the construction site.
      f. All construction personnel shall be required to attend the Construction Managers orientation process prior to the start of work.

E. On-Site Documents: The Contractor shall provide in a visible and accessible location in the on-site office:
   1. Complete, currently updated set of Specifications and Drawings, Change Orders, reviewed Shop Drawings, and other documents and samples.
   2. Permits and notifications required by laws and regulations.
   3. Standards, manuals, installation instructions, or reports required by individual Specification sections.
   4. Product MSDS Sheets.
   5. List of Owner, Owner's Representative, Architect, Architect's Consultants, Contractor's project manager, superintendent, assistant superintendent, subcontractors, building inspector, police, ambulance and fire departments; include telephone numbers and fax numbers.

F. Accommodation and Cooperation with the Owner: The Contractor shall cooperate with the Owner to the greatest extent possible. Disruptions and inconveniences to the activities of existing facilities to remain in operation during construction shall be minimized, and shall be subject to the prior approval of the Owner. The Contractor's cooperative efforts shall include, but shall not necessarily be limited to:
   1. Maintaining fire and all other safety standards acceptable to governing authorities.
   2. Protecting existing building construction, landscaping, site utilities, site improvements and features, and all other improvements within and about the project area. See Division 2 for more information.
   3. Obtaining abutters' written authorization to conduct construction related activities on their properties, if required. [NOTE: The Contractor shall obtain permits and approvals required to temporarily alter or obstruct sidewalks and street(s) if required.]

4. Storing on-site materials at locations acceptable to the Owner and governing authorities.
5. Controlling construction staging, parking, and traffic and limiting it to areas acceptable to the Owner and governing authorities.
6. Providing access for and cooperating with other contractors to be employed by the Owner.
7. Providing access for and cooperating with equipment and furnishing suppliers/installers (including the Owner's own forces) to be employed by the Owner.
8. Accommodating existing occupants and other ongoing activities within and about the Project. Such accommodations shall include, but shall not necessarily be limited to:
    a. Maintaining safe egress acceptable to governing authorities.
    b. Maintaining adequate heating, air conditioning, and ventilation.
    c. Maintaining fire suppression system.
    d. Maintaining electrical power, fire alarm, and detection systems, sound systems, intrusion detection systems, television, computer, and telephone services.
    e. Maintaining special systems and services such as emergency electrical power.
    f. Maintaining suitable toilet and janitorial facilities.
    g. Maintaining a watertight roof.
    h. Providing adequate dirt, dust, fume, vapor, and noise control. NOTE: The Contractor shall take special precautions to prevent the introduction of construction related dust, fumes, vapors, etc. from entering into HVAC system ducts, return air grilles, fresh air intakes, etc.)
    i. Providing temporary fire and smoke partitions acceptable to governing authorities.
    j. Providing adequate building security in areas under the Contractor’s control.
    k. Moving and relocating existing loose furniture, equipment and supplies as required to generally accommodate the Contractor will be the responsibility of the Owner, except as otherwise indicated on the Contract Documents.
    l. Scheduling work within the existing facility at times acceptable to the Owner and least disruptive to ongoing activities. Existing facilities shall remain in operation during the execution of the Work of this Contract. The Contractor shall schedule, phase, and coordinate the Work as required to maintain the safe and functional use of such facilities.

G. Phasing and Work Scheduling

Prior to completing and distributing the Construction Schedule or proceeding with the Work, the Contractor shall meet with the Owner, accurately assess the Owner’s requirements relative to the use of existing facilities, and schedule the Work accordingly.

a. All subcontractors shall coordinate with the Contractor to determine all phasing and sequencing requirements and to schedule the Work. Work shall be executed in such a manner that shall cause minimal or no disruptions of the Owner’s activities and the activities of other trades.
b. Coordinate all shut-downs, service disruptions, demolition, removals, temporary connectors, service change-overs, etc., required to avoid Owner disruption and/or inconvenience.
c. Coordinate all deliveries, installation, etc, as required to avoid Owner disruption and/or inconvenience.
d. Temporary ductwork, piping, wiring, controls, and equipment measures for essential systems such as air conditioning, ventilation, hydronic heating, domestic hot and cold water, storm drainage, sanitary sewer, controls, lighting, power, emergency systems, clocks, security, fire protection, etc. shall be provided to:
    1) Keep existing systems functional,
    2) Maintain services between existing components that must be redirected around construction areas,
    3) Alter, redirect, or make safe,
    4) Temporarily relocate equipment to facilitate phasing.
e. Partial and/or phased occupancy of the facility shall require systems start-ups, tests, balancing, and other similar activities to occur at the completion of each portion of the

Project, instead of exclusively at the completion of the entire Project. If system adjustments cannot be properly done until completion of the entire system, interim or temporary adjustments shall be provided for proper system operation and occupant comfort in occupied areas.

f. See Section 01 78 10 - Warranties for requirements regarding extended warranties for equipment serving phased occupancy.

g. It shall be the responsibility of the Contractor to review, coordinate and maintain informed all authorities with jurisdiction of the phasing plan throughout the construction process. All phasing shall adhere to emergency access requirements, operation of existing life safety systems and egress components per applicable code. All interruptions or configurations whether temporary or permanent must be reviewed and approved by both the Owner and applicable authority prior to such.

H. Safety: The Contractor shall assume full responsibility for all means, methods, procedures, sequences and techniques of construction employed and shall take all measures required to ensure the safety of construction workers, as well as the safety of the general public. The Contractor shall take into full consideration and assure himself that all necessary barricades, fencing, and shoring are provided and that they comply with applicable regulations and standards of good practice. The public shall be guarded from all construction hazards and/or attractive nuisances. The construction site is a part of existing occupied buildings and nearby major public thoroughfares. Therefore, site safety is of the utmost importance. The Contractor shall pay all costs necessary for temporary partitioning, barricading, fencing, shoring, walks, ramps, enclosures, flashing lights, warning signs, security and safety devices required for the maintenance of a clean and safe construction site.

1. Owner's Safety Policies: Prior to the commencement of construction, the Contractor shall thoroughly review the Owner's facility and occupant safety policies and procedures and shall inform all construction workers of their related responsibilities. Should the Contractor take exception to any of the Owner's policies and procedures, he shall so notify the Owner and Architect, in writing, prior to proceeding with the Work. The failure to provide such notification shall be construed as full acceptance of the Owner's policies and procedures.
2. MSDS Sheets: The Contractor shall furnish copies of Material Safety Data Sheets to the Owner for all materials classified as hazardous or poisonous. MSDS for all materials shall be maintained with the Contractor in a file on-site.

I. Indoor Air Quality Management:

1. The Contractor and his various subcontractors as he may direct shall implement procedures throughout construction in an effort to improve indoor air quality during the Owner's occupancy. See Section 01 57 21- Indoor Air Quality Controls.
2. The maintenance of a clean, dust-free environment in areas of the facility that remain operational or otherwise accessible to non-construction personnel shall be the shared responsibility of all construction personnel.
3. Control of dust, vapors, odors, and the spread of fire shall be considered of paramount importance. Unless otherwise specifically required by the Owner, the means and methods of achieving such control shall remain the exclusive responsibility of the Contractor, and not the Owner or Architect. However, the following may be considered:
   a. Construction of non-combustible partitions and enclosures.
   b. Negative pressure containment.
   c. Duct tape and sealant.
   d. Walk-off mats (adhesive treated).
   e. Vacuuming (with HEPA filtered vacuum).
   f. Closure of air intake vents (verify need for service prior to interruption).
4. The Contractor and his various subcontractors as he may direct shall implement the following procedures in an effort to improve indoor air quality during the Owner's occupancy:
   a. All adhesives (for construction, floor and wall coverings, etc.), paints, thinners, solvents, etc. shall, among other technical qualifications, be selected in consideration of minimizing their potential contribution to indoor air pollution. All "wet" products (i.e.

paint, sealers, and other liquid products) shall be installed before ceiling tile and carpet to minimize emissions interaction between building products.

b. Provide maximum all-outside-air ventilation during the installation of strong emitting materials. This shall be done for the purpose of reducing the contamination of other materials by absorption of solvents and other volatile components.

c. On projects where the Owner (or other user) occupies all or portions of the building during construction, the Contractor shall make every practical effort to minimize their exposure to fumes and dust from construction. Such efforts shall include items 1 through 3 above, as well as the construction of temporary air-tight barriers, maintaining negative air pressure in work areas, isolation of ventilation systems and all other appropriate means as determined by the Contractor.

J. Environmental Regulations: The Contractor shall comply with all applicable environmental laws and regulations. Particular attention shall be paid to proper dust, fume and vapor control throughout the building and site.

K. Hazardous Substances: The Architect's Scope of Services and responsibilities exclude the investigation, discovery, detection, identification, presence, leakage, release, use, handling, disposal, encapsulation, abatement, treatment, or removal of, or exposure of a person or persons to hazardous materials, pollutants, contaminants, or disease transmitting organisms, pre-existing or otherwise deposited in any form at the project, indoors or outdoors, at any time before, during or after construction, including but not limited to volatile organic compounds, petroleum products, bacteria, molds, fungus, asbestos or asbestos products, lead, radon, electro-magnetic frequency radiation or other radiation. Should any such substances be encountered, the Owner and Architect shall be promptly notified, in writing.

L. Layout and Field Engineering: The Contractor shall be responsible for all layout of all Work, even if such layout is done by others. The Contractor shall employ a qualified field engineer or land surveyor to determine all lines and grades and to field verify existing job conditions and measurements indicated on the Drawings. The Contractor's responsibility includes but is not necessarily limited to levels, control points, base lines, on-site bench marks, reference points, siting of building and other improvements, locations of components, fixtures, equipment, finishes, site improvements, etc.

1. The Contractor shall be responsible to submit a certificate signed by land surveyor registered in the State of Maine, hired by the Contractor, certifying that the location of new building lines and location and elevation of improvements comply with the Contract Documents.
2. The Owner has generally identified on the existing conditions survey, existing topography, utilities, wetlands, control points, and property line corner stakes.
3. The Contractor shall provide to the Architect written documentation to verify all layout. Include any deviations from the Contract Documents. Do not start any Work affected by such deviations until reviewed by the Architect.
4. The Contractor shall be responsible for costs of survey work including but not necessarily limited to establishing and protecting on–site benchmarks, replacement or relocation of bench marks, additional base lines or levels, reference points, location of site improvements, verification of existing building dimensions, layout and floor elevations. All discrepancies shall be reported to the Architect for clarification.
5. The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction. Verify the location and invert elevation at point of connection of sanitary sewer, storm drainage, and water service piping, etc.
6. The Contractor shall maintain a surveyor's log of control and other survey work. Record deviations from required lines, and level, and advise the Architect when deviations that exceed indicated or recognized tolerances are detected. On Project Record Drawings, record deviations that are accepted and not corrected.

7. The Contractor shall carefully examine all buildings, sites, and Contract Documents prior to submitting his Bid and satisfy himself as to the conditions under which he must operate to perform the Work. No additional compensation will be made to the Contractor for any error or negligence on his part, nor for discrepancies between actual conditions found at the buildings and sites and as indicated in the Contract Documents, unless such discrepancies are brought to the attention of the Architect by a Bidder or Sub-Bidder, in writing, prior to the opening of Bids.

M. Protection of Adjoining Property: The Contractor shall provide all shoring, fencing, and other work necessary to support, protect and keep unharmed all walls, footings, floors, roofs, walks, roadways and all other parts of any existing buildings, facilities, site improvements, land forms, trees and plant materials, etc. The Contractor shall hold the Owner and Architect harmless from any such damage due to any operations under this Contract. Any existing work or property damaged or disrupted as a result of this Contract shall be replaced or repaired to match original existing conditions at no additional cost to the Owner.

N. Utilities: The Contractor shall send proper notices, make all necessary arrangements and perform all other services required for the removal or the care, protection and maintenance of all utilities, including, but not limited to, mail boxes, fire plugs (hydrants), electric, gas, water, sewer, alarm, television, telephone, computer, and telegraph poles and wires, and all other items of this character above or below the ground, on and around the building site, assuming all responsibility and paying all costs related thereto. Related services to any existing facilities shall not be disrupted without the prior approval of the Owner, and then only to the minimum extent required. The Contractor shall comply with the "Underground Utility Damage Prevention System" by notification to DIG SAFE SYSTEM of intent to excavate near or around any underground utility installations. The Contractor shall call DIG SAFE SYSTEM at least 72 working day hours in advance of starting any such excavation.

O. Traffic Regulations and Parking: The Contractor shall properly regulate traffic at times when the Work interferes with the normal flow of traffic both on and off the site. Parking for workers on the project shall be limited to areas designated by the Owner or governing officials. Roadways and driveways outside the limits of the Contract shall be kept free of debris resulting from construction related traffic.

P. Roads and Access to the Site: Access to the site for workers and the delivery or removal of construction materials and/or equipment shall be made only from locations approved by governing authorities and acceptable to the Owner. Existing roads, lanes and other required fire access shall remain accessible to fire vehicles at all times. Hauling permits and route approvals shall be obtained from governing authorities as applicable.

Q. Security: The Contractor shall be responsible for the securing of new and existing structures against the entry of unauthorized persons at all times, including nights, holidays and days when the buildings may be unoccupied.
   1. When construction related personnel are the last to leave either the new or existing facilities, they shall verify that the entire building perimeter is properly secured.
   2. When non-construction related personnel are the last to leave either the new or existing facilities, the Contractor shall verify that all unoccupied areas are properly secured, and shall record the names and affiliations of those persons remaining in the facilities.

R. Permanent Fire Protection: At the earliest feasible date in each area of the Project, complete installation of permanent fire protection facilities, including connected services, and place into operation and use. Instruct key personnel on use of facilities.

S. Dewatering: The Contractor shall protect the Work, including but not limited to all excavations, trenches, buildings and materials from storm water, ground water, back-up or leakage of sewers, drains or other piping, and from water of any other origin and shall control, collect and dispose of any accumulation of such water.
   1. Dewatering operations shall include, but not be limited to:

a. Furnishing, operating, and maintaining all pumps, piping, drains, and other equipment, including spare units available for immediate use in the event of equipment breakdowns.
b. Designing, engineering, constructing, maintaining and removing cofferdams, temporary underdrains, wellpoints and all other systems necessary for dewatering.
c. Disposing of all water in a safe and proper manner, acceptable to governing authorities.

2. The Contractor shall pay all costs related to dewatering. All damage resulting from dewatering operations, or the failure of the Contractor to maintain the Work in a suitable dry condition, shall be promptly repaired by the Contractor at no additional cost to the Owner.

T. Snow Removal: The Contractor shall remove all snow or ice which might result in damage or delay to the Work.

U. Vandalism: The Contractor shall take all reasonable precautions necessary to prevent loss or damage caused by vandalism, theft, burglary, pilferage, or unexplained disappearance of property of the Owner, whether or not forming part of the Work, located within those areas of the Project to which the Contractor has access.

V. Existing Materials and Equipment: See Section 01 60 00 - Product Requirements.

W. Shipping and Storage of Materials: See Section 01 60 00 - Product Requirements.

X. Owner Furnished Equipment: See Section 01 60 00 - Product Requirements.

Y. Watertight Structure: The Contract Documents are not intended to depict each and every condition or detail of construction. As the knowledgeable party in the field, the Contractor is in the best position to verify that all construction is completed in a manner that will provide a watertight structure during construction (i.e. as needed to keep all interior construction dry both during and following its installation) and upon completion of construction. The Contractor shall be solely responsible for ensuring the watertight integrity of the structure.

Z. Guarantee: The Contractor shall guarantee the entire Work to be free from defective or improper work or materials, and shall make good any damage due to such work or materials for a term of one year from the date of the satisfactory completion and acceptance of the Work. See Section 01 78 10 - Warranties.

1.03 MEASUREMENT AND PAYMENT

A. Schedule of Values: Submit a preliminary sample of the Schedule of Values for review and comment regarding format and content to the Architect at the earliest feasible date, but in no case later than fourteen (14) days prior to submittal of the first Application for Payment. The Schedule of Values shall clearly identify the cost of the Work by trade, plus all General Conditions, Allowances, and accepted Alternates.

1. The cost of the Work for major trades shall be further broken down by major systems, components, labor, materials, sub-subcontracts or other appropriate means in sufficient detail to facilitate continued evaluation of project progress.
2. The format and general content of such schedule shall be acceptable to the Owner and Architect.
    a. Round amount off to the nearest whole dollar; the total shall equal the Contract Sum.
    b. No later than seven (7) days prior to submittal of the first Application for Payment, the Contractor shall submit to the Architect and Owner, the fully completed Schedule of Values.

B. Payment Requisition: The Contractor shall submit to the Architect three original copies of “Application for Payment”, AIA Forms G702 and G703, an itemized statement showing the original Contract Amount, the value of the Work to date, the amount previously approved, the amount presently requested and the balance remaining. Each copy shall be fully executed and properly signed and sealed.

1. Application for Payment entries shall match the Schedule of Values. Include amounts of Change Orders issued prior to the last day of the construction period covered by the application.
2. Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect and paid for by the Owner.
3. Progress payment dates shall be as established elsewhere in the Agreement. The Contractor shall submit a draft of the Application for Payment to the Architect sufficiently in advance of the due date to the Architect to allow for preliminary review and adjustments.
4. The Contractor shall clearly differentiate between items stored on-site and items stored off-site. For off-site stored materials, provide invoices, list of materials, insurance certificate, right of entry, transfer of title, and other documents as may be required by the Architect and Owner.
5. Provide invoices, vouchers, time sheets, and other documents as may be required by the Architect to verify labor and materials costs.
6. Each Application for Payment shall be accompanied by a transmittal listing all attachments.
7. Initial Application for Payment: The following administrative actions and submittals shall precede or coincide with the submittal of the first Application for Payment:
    a. List of subcontractors, principal suppliers, and fabricators.
    b. Schedule of Values.
    c. Contractor's Construction Schedule (preliminary, if not final).
    d. Contractor's Submittal Schedule (preliminary, if not final).
    e. List of Contractor's staff assignments.
    f. Copies of building permits, authorizations, and licenses from governing authorities.
    g. Certificates of insurance.
    h. Data needed to acquire Owner's insurance.
    i. Initial Progress Report.
    j. Performance and Payment Bonds, if applicable.
8. Application for Payment at Substantial Completion: Submit an Application for Payment following issuance of the Certificate of Substantial Completion. The application shall reflect any Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work. See AIA 201 General Conditions of the Contract. The following administrative actions and submittals shall precede or coincide with the submittal of this Application for Payment:
    a. Occupancy permits, as applicable.
    b. Warranties and maintenance agreements.
    c. Testing / adjusting / balancing reports.
    d. Maintenance instructions.
    e. Meter readings, as applicable.
    f. Start-up performance reports.
    g. Change-over information related to Owner's occupancy, use operation and maintenance.
    h. Final cleaning.
    i. Application for reduction of retainage, and consent of surety.
    j. Advice on shifting insurance coverage.
    k. List of incomplete Work, recognized as exception to the Architect's Certificate of Substantial Completion, if any.
9. Final Application for Payment: This application shall reflect any Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work. See Article regarding Final Payment of the Agreement and AIA 201 General Conditions of the Contract. The following administrative actions and submittals shall precede or coincide with the submittal of the final Application for Payment:
    a. All items required by Article 9 "Payments & Completion" of AIA A201.
    b. Completion of Project close-out requirements.

c. Completion of items specified for completion after Substantial Completion.
d. Assurance that unsettled claims will be settled.
e. Transmittal of required Project construction records, including Record Drawings to the Owner.
f. Proof that taxes, fees and similar obligations have been paid.
g. Removal of temporary facilities and services.
h. Removal of surplus materials, rubbish, and similar elements.

C. Waivers of Mechanics Lien: With each Application for Payment, submit waivers of mechanics lien for every entity who is lawfully entitled to file a lien arising out the Contract and related to the Work covered by the Payment. See AIA A201 General Conditions of the Contract.
1. The Contractor shall promptly execute a partial waiver of mechanics lien for the period of construction covered by each application. Executed waivers shall be submitted to the Architect with the submittal of the next Application for Payment by the Contractor. With each Application for Payment, submit partial waiver of mechanics liens from subcontractors, or sub-subcontractors and suppliers for the construction period covered by the previous application.
2. When an application shows completion of an item, submit final or full waivers when retainage is released.
3. The Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Submit the final Application for Payment with or preceded by final waivers from every entity involved with the performance of the Work covered by the application who could lawfully be entitled to a lien. The total amount of each entity's final waiver of lien shall equal the Contact Sum for that entity including all additions and reductions thereto.
5. Submit waiver of liens on the following forms, and executed in a manner, acceptable to the Owner:
a. Partial waiver of liens: Form provided by the Contractor and acceptable to the Architect and Owner.
b. Final waiver of liens: AIA G706A Contractor's Affidavit of Payment of Release of Liens or another form acceptable to the Architect and Owner.

D. Schedule Update: Along with each payment requisition, the Contractor shall submit construction photographs and a report on the status of the next month's construction schedule. Each such monthly report shall update the progress of the Work and shall identify:
1. Areas of the building and site expected to be worked on during the next month.
2. Special conditions or circumstances that may affect the safe use of the building or site.

1.04 MODIFICATION PROCEDURES

A. Minor Changes to the Work: Supplemental Instructions, authorizing minor changes in the Work, not involving an adjustment to the Contract Sum or Contract Time, may be issued by the Architect.

B. Architect / Owner Initiated Change Order Proposal Requests: The Architect shall issue Proposal Requests that describe proposed changes in the Work that may require adjustment to the Contract Sum and/or Contract Time. The Architect will provide supplemental sketches or revised Drawings and Specifications as necessary.
1. Proposal requests are for information only. Do not consider them an instruction either to stop work in progress, or to execute the proposed change.
2. Unless otherwise indicated in the proposal request, within ten working days of receipt of the proposal request, the Contractor shall submit to the Architect and Owner for review, an estimate of cost necessary to execute the proposed change. Include an itemization of quantities, unit costs, etc. Include all related charges and a statement indicating the effect the proposed change will have on the Contract Time.

C. Contractor Initiated Change Order Proposal Requests: The Contractor may propose changes when latent or other unforeseen conditions require modifications to the Contract, by submitting a request for a change to the Architect.

1. Provide a complete description of the proposed change. Indicate the reason for the change and the effect of the change on the Work, the Contract Sum and the Contract Time. Include an itemization of quantities, unit costs, etc. and include all related charges. Comply with requirements for “Substitutions”.

D. Allowances: See Section 01 21 00 - Allowances. For allowance cost adjustment, base Change Order Proposal on the difference between the actual purchase amount and the allowance, multiplied by the measurement for work-in-place. Submit substantiation of all changes in Work claimed in the Change Orders. The Owner reserves the right to establish the actual quantity of work-in-place by independent quantity survey, measure, or count.
   1. No change to the Contractor’s indirect expense is permitted for selection of higher or lower priced materials or systems of the same scope and nature as originally indicated. A change in the Contractor’s indirect expense will only be allowed when it is clearly demonstrated that either the nature or scope of the Work was changed from that which could be foreseen from the description of the allowance and other information in the Contract Documents.

E. Construction Change Directive: Construction Change Directives, containing descriptions of changes in the Work and designating methods to be followed to determine changes in the Contract Sum and/or Contract Time may be issued by the Architect.
   1. Maintain detailed records of time and materials related to the Work required by the Construction Change Directive. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

F. Change Order Procedures: Upon the Owner’s approval of a Change Order Proposal Request, the Architect will issue a Change Order for signatures of the Owner and Contractor, in triplicate.

1.05 SUBSTITUTIONS

A. Substitutions are changes, modifications or deviations in those products, materials, equipment, and methods of construction required by the Contract Documents proposed by the Contractor after the receipt of Bids. Substitutions for the convenience of the Contract or subcontractors, or materials suppliers will only be considered if submitted prior to the receipt of Bids, in strict conformance with the Instructions to Sub-bidders. The following shall not be considered substitutions:
   1. Changes, modifications, or deviations requested by Bidders during the bidding period and accepted prior to the receipt of Bids shall be considered as included in the Contact Documents and are not subject to the requirements of this Section.
   2. Revisions to Contract Documents requested by the Owner or Architect.
   3. Specified options of products or materials included in the Contract Documents.
   4. The Contractor’s compliance with governing regulations and orders issued by governing authorities, subject to the Architect’s prior written notice and approval.

B. Substitution Requests: See Section 01 60 00 - Product Requirements, for substitution request procedures.

1.06 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for requirements regarding submission of:
   1. Outline Construction Schedule.
   2. Comprehensive Construction Schedule.
   3. Schedule of Materials.
   4. Schedule of Submittals.
   5. Shop Drawings, Product Data and Samples.
   6. Mock-ups and Sample Field Installations.
   7. Requests for Substitution

1.07 ELECTRONIC MEDIA

A. Electronic Media: See Section 01 00 30 - Electronic Media, for information regarding obtaining the Contract Documents electronically and their limited use for purposes of project coordination,

Contractor's use in the preparation of submittals, and Contractor's use in the preparation of Record Drawings.

1.08 COST CONTROL

A. Cost Estimating: The Contractor shall take charge of, and assume sole responsibility for, all construction cost estimating. He shall provide cost data of not less than industry standard degree of accuracy to the Owner and Architect on a timely basis, in order to allow adequate time for Project budgeting and design. At a minimum, budget updates shall be provided during each of the traditional phases of design (Schematic Design, Design Development, and Construction Documents).

B. Availability of Documentation: It is understood that the Contractor will prepare his initial cost estimates without the benefit of complete architectural and engineering documents. Therefore, it shall be the Contractor's responsibility to satisfy himself that he has conducted his own investigations, reasonably identified the full scope of the Work, made appropriate allowances and contingencies, and acquired an understanding of the Project adequate for the preparation of accurate and reliable estimates.

1.09 QUALITY CONTROL

A. General: The Owner shall employ an independent testing agency for the purpose of testing and inspecting portions of the Work in progress. The Contractor and his various subcontractors shall be responsible for specific testing and inspections as identified in individual specification sections. See Section 01 40 00 - Quality Requirements and Section 01 21 00 - Allowances.

1.10 TEMPORARY FACILITIES

A. See Section 01 50 00 - Temporary Facilities and Controls, for information regarding:
   1. Field offices and storage sheds.
   2. Project signs.
   3. Temporary utilities.
   4. Temporary stairs, hoists, and lifts.
   5. Temporary enclosures and heat.
   6. Sanitary facilities.
   7. Temporary protective covering of finished work.
   8. Temporary protection of existing facilities.
   9. Temporary fencing.
   10. Temporary fire protection.
   11. Temporary drainage and storm water control.
   12. Temporary parking and roads.
   13. Clean-up and waste removal.

1.11 PROJECT MEETINGS

A. The Contractor shall schedule the following project meetings including but not limited to:
   1. Pre-Construction Meeting.
   2. Pre-Installation Meetings.
   3. Coordination Meetings.
   4. Job Meetings.
   5. Project Close-out Meeting.
   6. Other meetings as necessary.

B. Pre-Construction Meeting: The Contractor shall conduct an initial organization meeting at the Project site or other convenient location after the Notice to Proceed and prior to commencement of construction activities. The Owner, Architect, Owner's Representative, Contractor, his Superintendent, major subcontractors, and other concerned parties shall each be represented at the meeting by persons familiar with and authorized to conclude matters related to the Work. The Contractor shall record the minutes of this meeting. The minutes shall be distributed promptly to all participants.
   1. Agenda items shall include, but not be limited to:

a. Notice to Proceed
b. Designation of personnel representing the parties and their responsibilities.
c. Contract Documents: on-site documents, discrepancies or omissions, interpretations and clarifications.
d. Subcontractors
e. Schedule of Values
f. Insurance requirements.
g. Application for Payment: progress payments, Substantial Completion, off-site stored materials.
h. Project meetings.
i. Layout.
j. Scheduling: Construction schedule, working hours, overtime, holidays.
k. Permits and regulations
l. Testing and inspections.
m. Submittals: schedule, process, shop drawings, samples, record documents.
n. Substitutions.
o. Changes.
p. Job responsibilities: Superintendent, Owner's Representative.
q. Temporary facilities: parking, staging areas, site security, water, power, clean-up
r. Job safety.

C. Pre-Installation Meetings: The Contractor shall conduct pre-installation meetings before each major construction activity that requires coordination is begun. Attendees may include the Contractor, Superintendent, Owner's Representative, Architect, Installers, Manufacturer's representatives, and fabricators. Refer to individual Specification Sections for required pre-installation meetings. Review progress of other construction activities and preparation for the particular activity under consideration.

D. Coordination Meetings: The Contractor shall conduct coordination meetings at regularly scheduled times convenient to all parties. All major subcontractors shall be represented and other trades or subcontractors as required for coordination, planning and scheduling construction activities. The Contractor shall bring any significant issues to the next Job Meeting.

E. Job Meetings: The Contractor shall conduct regular job meetings once every two weeks, or more frequently if required, during the construction period, at such time as is mutually acceptable to the Owner, Architect and Contractor. All major subcontractors shall be represented at each meeting as needed. Other trades or subcontractors may be called to particular job meetings as the progress of the Work requires. The Contractor shall record the minutes of each meeting. The minutes shall be distributed promptly to all participants.
1. Agenda items shall include, but not be limited to:
a. Review construction progress since the last meeting.
b. Review work progress in relation to the Construction Schedule.
c. Review "Old Business" and new items significant to the Work.
d. Review issues regarding construction activities and Owner's on-going occupancy.
e. Review work sequence, deliveries, hazards, quality standards, housekeeping, security, etc.
f. Review Change Orders, Proposal Requests, Requests for Information, Supplemental Instructions.
g. The Contractor will distribute updated Construction Schedule once per month.

F. Project Close-out Meeting: See Section 01 78 00 - Project Close-out.

1.12 WARRANTIES

A. See Section 01 78 10 - Warranties, for requirements regarding submission of a bound set of warranties and certificates as required by the Contract Documents.

1.13 PROJECT CLOSE-OUT

A. See Section 01 78 00 - Project Close-out, for requirements regarding:

1. Substantial Completion procedures, including Project Close-out Meeting and Occupancy Permit.
2. Architect's evaluation of the Work.
3. Final Acceptance procedures.
4. Project record documents submittal, including O&M manuals, warranties binder, record photographs, and record drawings.
5. Spare parts and extra materials procedures.
6. Indoor Air Quality Management, building commissioning and systems testing.
7. Operating and maintenance instructional sessions.
8. Final cleaning.
9. Contractor's Certificate of No Hazardous Materials.
    a. Testing agency final report.

B. Occupation by the Owner: The Owner shall have the right to take possession of and use any completed or partially completed portions of the Work, notwithstanding the fact that the time for completing the entire Work or such portions thereof may not have expired; but such possession and use shall not be an acceptance of the Work.

1.14 TIME FOR COMPLETION

A. Time is of the essence of the Contract, and the Work to be performed under the Contract shall be commenced on or before July 2015, and shall be Substantially Complete and in receipt of an Occupancy Permit on or before August 2016.

B. It is expressly understood and agreed, by and between the Contractor and the Owner, that the time for completion of the Work described herein is reasonable for the completion of same, taking into consideration the climatic and industrial conditions prevailing in this locality.

END OF SECTION

SECTION 01 00 30
ELECTRONIC MEDIA

PART 1 - GENERAL

1.01 DESCRIPTION

A. The provisions of this Section apply to each and every contract and contractor or other person or persons supplying labor, material, equipment and/or services entering into this Project and/or on the premises directly or indirectly.

B. Following the receipt of a written request by the Contractor, signed Electronic Data Transfer and Non-Disclosure Agreement, and if applicable, payment in full from the Contractor, the Architect will make available an electronic data version of the Project, for the limited purposes described in this Agreement. It shall be the Contractor's responsibility to make electronic files available to subcontractors in accordance with the Electronic Data Transfer and Non-Disclosure Agreement.

ELECTRONIC DATA TRANSFER AND NON-DISCLOSURE AGREEMENT

The Agreement is entered into and agreed by, between and among Lavallee Brensinger Professional Association (LBA), and PC Construction Company (Recipient) and is made in reference to the LBA No. 13-059-00, Park Danforth Project. It is understood and agreed that it may become desirable for LBA to make certain Instruments of Service in electronic machine readable format, hereinafter referred to as "Electronic Data" available to other parties related to the Project. It is also understood that such information is proprietary to LBA and that LBA intends to limit its distribution and use. It is the intent of the Agreement to govern all circumstances under which Electronic Data is made available by LBA.

In consideration of the request of PC Construction Company (Recipient) to LBA to deliver to Recipient or otherwise enable the Recipient to access certain Electronic Data for use on the Project, the parties mutually agree as follows:

1. Electronic Data includes but is not limited to, computer-aided design files including native file formats (DWG), Building Information Models (BIM), files produced by word processing, spread sheet, scheduling, data base and other software programs. Computer-Aided-Design files shall be provided as Autocad.dwg files. Building Information Models shall be provided as Revit.rvt files.

2. The means by which the Electronic Data is transferred may include, but are not limited to, electronic mail, File Transfer Protocol sites and CD-Rom, transmitted between the parties in this Agreement. Recipient acknowledges that Electronic Data transferred in any manner or translated from the system and format used by LBA to an alternate system or format is subject to errors that may affect the accuracy and reliability of the data and that the data may be altered, whether inadvertently or otherwise. Accordingly, LBA makes no warranty, express or implied, as to the correctness, accuracy, and/or completeness of the information transferred. Although LBA may issue information throughout the development of the Project, LBA does not represent that the information provided includes all revisions to-date, nor shall LBA assume any responsibility for providing updated information as the Project proceeds.

3. LBA reserves the right to retain hard copy originals in addition to electronic copies of the Electronic Data transferred, which originals shall be referred to and shall govern in the event of any inconsistency with the transferred data. Should the recipient discover errors or conflicts in any transferred files, he shall promptly notify LBA.

4. As consideration to LBA for the transfer of the Electronic Data, Recipient agrees that the use of Electronic Data shall be entirely at his/her own risk, and that LBA shall not be liable for, and Recipient hereby waives all claims and agrees to indemnify and hold LBA harmless from all liabilities, claims, losses, damages or expenses (including attorneys' fees) arising out of, or connected with: (1) the transfer of Electronic Data by any means; or (2) the use, modification or misuse of the Electronic Data by parties other than LBA; or (3) the limited life expectancy and decline of accuracy or readability of the Electronic Data due to storage; or (4) translation and data errors; or (5) any use of the Electronic Data by any third parties receiving the data from other parties to this Agreement; or (6) the incompatibility of software or hardware used by LBA and the other parties to this Agreement.

5. **The Electronic Data provided by LBA under the terms of this Agreement is the proprietary information of LBA, containing designs, details, model elements and other information developed by LBA. LBA is willing to supply such information only if the Recipient enters into this Non-Disclosure Agreement and agrees to strictly enforce its terms and conditions. All Electronic Data is to be treated as confidential and is not to be disclosed to or shared with any third parties, not expressly allowed herein, without LBA's express, written consent.**

6. Recipient agrees to maintain and protect any and all proprietary information of LBA and to exercise great care in the preservation of its confidentiality. The Recipient will disclose the proprietary information only to its own employees, and then only to the extent required for the design and construction of this Project. The Recipient shall be responsible for any unauthorized use or disclosure of LBA's proprietary information by anyone to whom it may disclose such information.

7. The Recipient agrees that any and all Electronic Data shall remain the property of LBA. Neither the execution of this Agreement, nor the transfer of Electronic Data shall constitute a conveyance or transfer to the Recipient of any right, interest, or license in the proprietary materials. The Recipient shall not reproduce any proprietary information without the express written authorization of LBA.

8. Electronic Data are provided as a convenience to the Recipient for informational purposes only in connection with the Recipient's performance of its responsibilities and obligations relating to the Project. The Electronic Data do not replace or supplement the paper copies of the Drawings and Specifications which are and remain, the Contract Documents for the Project.

9. **Electronic Data shall only be used for purposes allowable by this Agreement. It is understood and agreed that, without the separate express written permission of LBA to do so, the Electronic Data are not to be used for any purpose whatsoever, by anyone (any contractor or any of its subcontractors of any tier or any materials supplier or vendor) other than the Recipient. It shall be the responsibility of the Recipient to notify LBA of any and all third parties with whom the Recipient wishes to share LBA's Electronic Data, to identify the intended uses of the information, and to obtain LBA's prior written authorization to share LBA's information.**

10. All transmittal of Electronic Data whether by CD-Rom, e-mail, Internet or any other methods shall require that the file name, size, date and time be recorded along with the date and time of transmission (if by electronic means) and the identity of the sender and recipient.

11. The Recipient further agrees to indemnify and save harmless LBA and its sub-consultant and each of their partners, officers, shareholders, directors and employees

from any and all claims, judgments, suits, liabilities, damages, costs or expenses (including reasonable defense and attorneys' fees) arising as the result of either: 1) Recipient's failure to comply with any of the requirements of the Electronic Data Transfer Agreement; or 2) a defect, error or omission in the Electronic Data or the information contained therein, which defect error or omission was not contained in the Contact Documents as defined in paragraph 3 or where the use of such Contact Documents would have prevented the claim, judgment, suit, liability, damage, cost or expense.

12. This agreement shall be interpreted under the laws of the State of New Hampshire. The Recipient hereby agrees that the breach of this Agreement by the Recipient will cause LBA considerable harm, and LBA shall be entitled to recover damages, as well as all expenses and costs incurred by LBA arising out of or related to such breach, including, without limitation, reasonable attorney's fees and costs.

13. In general, the protocols for the distribution of Electronic Data shall be as follows:

a. LBA may make certain Electronic Data available to PC Construction Company (Recipient - MUST be Owner, Construction Manager or General Contractor) free of charge, providing that:
    1) Such files can be issued in the format currently used by LBA, without modification.
    2) The Recipient delivers to LBA a fully executed copy of this Agreement and, among other requirements, agrees not to share LBA's Electronic Data with any third parties without LBA's prior written authorization.
b. In the event the Recipient wishes to share LBA's Electronic Data with a third party:
    1) The Recipient shall first forward a complete list of all such third parties to LBA for LBA's prior written authorization. The list shall include all third party names, addresses, telephone numbers, and email addresses.
    2) Each individual third party shall then deliver, through the Recipient, a fully executed copy of this Agreement.
c. In the event that it is necessary for LBA to convert files from its currently used format of REVIT 2015 to an alternative format, LBA shall be compensated for such conversion at the rate of $75.00 per file, payable in advance.

The parties have executed this Agreement as of the dates stated below:

RECIPIENT
Company: PC Construction Company

By: _____
Title: _____
Date: _____

LBA
Title: _____
Date: _____

END OF SECTION

SECTION 01 21 00
ALLOWANCES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cash Lump Sum and Unit Cost allowances.

B. Inspecting and testing allowances.

1.02 RELATED REQUIREMENTS

A. Section 01 00 00 - General Requirements: Additional payment and modification procedures.

1.03 CASH ALLOWANCES

A. Types of allowances required include Lump Sum allowances and Unit Cost allowances.

B. All Allowances under this Section shall be included in the Base Bid and shall be carried by the Contractor, unless specifically indicated to be carried by a subcontractor.

C. The Contract shall cause the work covered by these Allowances to be performed for such amounts and by such persons as the Owner may direct, but he will not be required to employ persons against whom he makes a reasonable objection.

D. Costs Included in Cash Allowances: Cost of product to the Contractor or subcontractor, less applicable trade discounts, and other costs, if any, specifically included in the description of the Allowance.

E. Costs Not Included in Cash Allowances: Product delivery to site and handling at the site, including unloading, uncrating, and storage; protection of products from elements and from damage; and labor for installation and finishing, unless specifically included in the description of the Allowance.

F. Refer to related Drawings and Specifications for additional information regarding Work to be included as a part of Allowances.

G. Architect Responsibilities:
   1. Consult with Contractor for consideration and selection of products, suppliers, and installers.
   2. Select products in consultation with Owner and transmit decision to Contractor.
   3. Prepare Change Order.

H. Contractor Responsibilities:
   1. At the earliest practical date after award of the Contract, advise the Architect of the date when selection and purchase of each product or system described by an Allowance must be completed to avoid delaying the Work.
   2. Assist Architect in selection of products. Where services, products and/or systems are selected by the Owner, purchase such items from the designated supplier.
   3. Obtain proposals from suppliers and installers for use in making final selections and offer recommendations.
   4. On notification of which products have been selected, execute purchase agreement with designated supplier and installer.
   5. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
   6. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.
   7. Submit invoices or delivery slips to show quantities of materials delivered to the site for use in fulfilling each allowance.
   8. Cost monitoring:
      a. Monitor progress of Allowance costs and expenditures and regularly report to the Architect and Owner.

b. Provide written advance notice to Architect and Owner if Allowance is likely to be exceeded.
c. Obtain Owner's written authorization prior to incurring costs in excess of the stated Allowance.
d. The Contractor shall assume responsibility for all costs in excess of the stated Allowance with failure to perform the above cost monitoring procedures.

I. If the cost, when determined, is more than or less than the Allowance, the Contract Sum shall be adjusted accordingly by Change Order, which will include additional or reduced handling costs on the site, labor, installation costs, overhead, profit and other expenses resulting to the Contractor for any increase over or decrease from the original Allowance.

PART 2 - ALLOWANCES

2.01 INSPECTING AND TESTING ALLOWANCE

A. Allow the sum of $ TO BE DETERMINED for soils, paving, cast-in-place concrete, precast concrete, masonry, structural steel, fabricated metal work, structural wood, fire-proofing and exterior insulation finish system testing and inspection services provided by the Owner, to establish compliance with the Contract Documents. The Owner will solicit proposals and select the Testing Agency. All reports and invoices shall be submitted to the Architect and Owner prior to payment. See Section 01 40 00 - Quality Requirements.

B. Costs Not Included in the Inspecting and Testing Allowance:
1. Costs of incidental labor and facilities required to assist Testing Agency.
2. Costs of testing services required to be provided by the Contractor or any subcontractor. Document requirements.
3. Costs of retesting upon failure of previous tests as determined by Architect.

C. Payment Procedures:
1. Submit two copies of the Testing Agency's invoice with next Application For Payment to Architect.
2. Pay invoice on approval by Architect.

D. Differences in cost will be adjusted by Change Order.

2.02 GRAPHICS

A. Allow the sum of $ TO BE DETERMINED for the purchase and installation of architectural graphics, signage and plaques. This Allowance shall be in addition to the Work of Section 10 14 24: Interior Signage.

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 23 00
ALTERNATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Description of alternates.

B. The Contractor shall provide all labor, materials, equipment, and services, etc., necessary for the proper and complete execution of accepted Alternates. Amount of Alternate prices to be added to or deducted from the Base Bid shall be stated on the Proposal Form and shall include cost of any and all modifications made necessary by Owner's acceptance of Alternates.

C. Related Work Described Elsewhere:
   1. Materials and methods to be used in the Base Bid and in the Alternatives are generally described in the Contract Documents.
   2. Method for stating the proposed Contract Sum is described in the Proposal Form.

D. NOTE: Alternates will be carefully considered in the Owner's selection of a Contractor.

1.02 RELATED REQUIREMENTS

A. Document 00 21 13 - Instructions to Sub-bidders: Instructions for preparation of pricing for alternatives.

1.03 ACCEPTANCE OF ALTERNATES

A. If the Owner elects to proceed on the basis of one or more of the described Alternates, make all modifications to the Work required in order to furnish and install the selected Alternate or Alternates to the approval of the Architect and at no additional cost to the Owner, other than as proposed on the Proposal Form.

B. Immediately after award of the Contract, or as soon thereafter as the Owner has made a decision on which, if any, Alternates will be selected, thoroughly and clearly advise all necessary personnel and suppliers as to the nature and extent of Alternates selected by the Owner. Use all means necessary to alert those personnel and suppliers involved as to all changes in the Work caused by the Owner's selection or rejection of Alternates.

C. It shall be the responsibility of the Contractor to properly coordinate work related to Alternates with all other Work of this Contract in order to ensure that a complete and proper job is provided.
   1. Include as part of each Alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not mentioned as part of the Alternate.

D. Submit a Schedule of Values including adjustments to all Sections affected by accepted Alternates.

E. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted alternates will be identified in the Owner-Contractor Agreement.

F. Coordinate related work and modify surrounding work to integrate the Work of each alternate.

1.04 SCHEDULE OF ALTERNATES

A. Alternate No.1 (Concrete Slab Moisture Barrier System for Resilient Flooring)
   1. No.1A: State the amount to be ADDED to the Base Bid to furnish and install the slab moisture barrier system and primer, if Owner's field testing indicates an issue with slab moisture vapor and alkalinity levels for flooring installations. See Section 09 65 00 - Resilient Flooring.
   2. No. 1B: State the amount to be ADDED to the Base Bid to provide blast-trac slab surface preparation to remove surface slab contaminants and produce a bondable surface as required by the slab moisture barrier system.

3. No. 1C: State the amount to be ADDED to the Base Bid to provide self-leveling cement-based underlayment. See Section 09 65 00 - Resilient Flooring.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 30 00
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preconstruction meeting.
B. Site mobilization meeting.
C. Job meetings.
D. Construction reports.
E. Construction Progress Schedule.
F. Materials Schedule.
G. Submittal Schedule.
H. Progress photographs.
I. Coordination Drawings.
J. Shop Drawings.
K. Approval Drawings.
L. Product Data, Certifications, Delegated-Design Submittals
M. Submittals for review, information, and project closeout.
N. Submittal procedures.
O. Architect's Review

1.02 RELATED REQUIREMENTS

A. Section 01 00 00 - General Requirements.
B. Section 01 78 10 - Warranties.
C. Section 01 78 00 - Project Close-out: Project record documents.

1.03 PROJECT COORDINATION

A. Project Coordinator: Contractor.
B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for delivery access, traffic, and parking facilities.
C. During construction, coordinate use of site and facilities through the Project Coordinator.
D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities.
F. Coordinate field engineering and layout work under instructions of the Project Coordinator.
G. Make the following types of submittals to Architect through the Project Coordinator:
    1. Requests for interpretation.
    2. Requests for substitution.
    3. Shop drawings, product data, and samples.
    4. Test and inspection reports.
    5. Manufacturer's instructions and field reports.
    6. Applications for payment and change order requests.
    7. Progress schedules.
    8. Coordination drawings.

9. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

A. Owner will schedule a meeting after Notice of Award.

B. Attendance Required:
   1. Owner.
   2. Architect.
   3. Contractor.

C. Agenda:
   1. Introductions of attendees and their Project duties.
   2. Execution of Owner- Contractor Agreement.
   3. Submission of executed bonds and insurance certificates.
   4. Distribution of Contract Documents.
   5. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
   6. Designation of personnel representing the parties to Contract, Owner and Architect.
   7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
   8. Scheduling.

D. Contractor shall record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

3.02 SITE MOBILIZATION MEETING

A. The Contractor shall schedule a meeting at the Project site prior to his occupancy.

B. Attendance Required:
   1. Contractor.
   2. Owner.
   3. Architect.
   4. Contractor's Superintendent.
   5. Major Subcontractors.

C. Agenda:
   1. Use of premises by Owner and Contractor.
   2. Owner's requirements and occupancy prior to completion.
   3. Construction facilities and controls provided by Owner.
   4. Temporary utilities provided by Owner.
   5. Survey and building layout.
   6. Security and housekeeping procedures.
   7. Schedules.
   8. Application for payment procedures.
   9. Scope and procedures for testing and inspections. Review of Statement of Special Inspections and Testing Agency duties.
   10. Procedures for maintaining record documents.
   11. Requirements for start-up of equipment.
   12. Inspection and acceptance of equipment put into service during construction period.

D. Contractor shall record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

3.03 JOB MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum bi-monthly intervals.

B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner, Architect, as appropriate to agenda topics for each meeting.

D. Agenda:
   1. Review minutes of previous meetings.
   2. Review of Work progress.
   3. Field observations, problems, and decisions.
   4. Identification of problems that impede, or will impede, planned progress.
   5. Review of submittals schedule and status of submittals.
   6. Maintenance of progress schedule.
   7. Corrective measures to regain projected schedules.
   8. Planned progress during succeeding work period.
   9. Maintenance of quality and work standards.
   10. Review of testing and inspection reports.
   11. Effect of proposed changes on progress schedule and coordination.
   12. Other business relating to Work.

E. Contractor shall record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

3.04 CONSTRUCTION REPORTS

A. The Contractor's superintendent shall maintain an on-site daily construction log, recording the following information concerning events at the site and allow access to the Owner and Architect for review.
   1. List of subcontractors at the site.
   2. Approximate count of personnel at the site.
   3. Visitors at the site.
   4. High and low temperatures, general weather conditions.
   5. Accidents and unusual events.
   6. Meetings held at the site.
   7. Communications received or conveyed by the superintendent.
   8. Stoppages, delays, shortage, losses.
   9. Meter readings and similar recordings.
   10. Emergency procedures.
   11. Orders and requests of governing authorities.
   12. Testing agency observations and tests.
   13. Change orders received and implemented.
   14. Services connected, disconnected.
   15. Significant deliveries.
   16. Equipment or system tests and start-ups.
   17. Partial completions, occupancies.
   18. Substantial Completions authorized.
   19. Masonry reports.

3.05 CONSTRUCTION PROGRESS SCHEDULE

A. Within 10 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.

B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

C. Within 10 days after joint review, submit complete schedule.

D. Submit updated schedule with each Application for Payment.

3.06 CONTRACTOR'S SCHEDULE OF MATERIALS

A. Within twenty-one (21) days after date established for the Commencement of the Work, prepare and submit to the Architect a projected schedule for materials delivery, clearly identifying all products with long lead times or which are likely to cause delay due to unavailability, extended delivery dates or any other reason. Once approved, long lead times shall be pre-ordered in a timely manner as not to delay the progress of the Work. The Contractor shall assume full responsibility for delays attributed to unavailability, insufficient time for delivery and/or installation of materials or performance of the Work, unless he has conformed with these instructions.

3.07 CONTRACTOR'S SUBMITTAL SCHEDULE

A. Within ten (10) days after development and acceptance of the Contractor's Construction Schedule, prepare and submit to the Architect a complete schedule of submittals. Coordinate schedule with subcontractors and provide adequate time for review, processing and the possibility of non-acceptance and resubmission. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of ordering materials or performance of the Work to permit processing. Update schedule as necessary.

3.08 PROGRESS PHOTOGRAPHS

A. Submit a minimum of 20 digital photographs with each application for payment, taken not more than 7 days prior to submission of Application For Payment.
   1. Provide an electronic file.
   2. Identify project name, date, description of view and key plan of location if needed.

B. Maintain one set of all photographs at Project site for reference; same copies as submitted, identified as such.

C. Select locations to provide diversified overall views of the Work, from positions that are expected to remain accessible throughout the progress of the Work. When so directed by the Architect, change locations to new locations inside or outside the building.

D. Provide auxiliary lighting as required to produce clear, well lit photographs without obscuring shadows. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion

E. Photography Type: Digital; electronic files.

F. Provide photographs of site and construction throughout progress of Work.

G. In addition to periodic, recurring views, take photographs of each of the following events:
   1. Completion of site clearing.
   2. Excavations in progress.
   3. Foundations in progress and upon completion.
   4. Structural framing in progress and upon completion.
   5. Enclosure of building, upon completion.

H. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
   1. Delivery Medium: On photo CD, flash drive, e-mail or link to on-line file share site either hosted by the Contractor or other, such as DropBox.
   2. File Naming: Include project identification, date and time of view, and view identification.
   3. Photo CD(s): Provide 1 copy including all photos cumulative to date and PDF file(s), with files organized in separate folders by submittal date.

3.09 SHOP DRAWINGS

A. Shop Drawings: Shop drawings include fabrication and installation drawings, coordination drawings, setting diagrams, schedules, patterns, templates, and similar drawings specially

prepared for the Work by the Contractor, subcontractors, manufacturers, fabricators, suppliers or distributors to illustrate some portion of the Work.

1. Shop drawings shall show the design, dimensions, connections, and other details necessary to ensure the accurate interpretation of the Contract Documents and shall show adjoining Work in such detail as required to provide for proper connection to same. Where adjoining Work requires shop drawings, they shall be submitted concurrently for a coordinated review.
2. Submit information specifically prepared for this Project, drawn to accurate scale. Do not reproduce Construction Documents or copy standard information as the basis for shop drawings. Standard information prepared without specific reference to the Project is not considered a shop drawing. Clearly and specifically indicate deviations from the Contract Documents.
3. In addition to the above, include the following information:
    a. Dimensions and notation of dimensions established by field measurements.
    b. Identification of products and materials included.
    c. Compliance with specified standards.
    d. Notation of coordination requirements and specific procedures.
    e. Utility connections for equipment.
    f. Identification of any change, variance or non-conformance with requirements of Contract Documents. Indicate with a "cloud" and provide detailed notation including reason for each change. Include completed "Contractor's Substitution Request" (See Section 01 60 00).
    g. Indication by the Contractor that he has reviewed, coordinated (checked for dimension, quantity, relationship with work of all trades involved and is in accordance with the Contract requirements), and approved the Shop Drawing for submittal to the Architect.
4. Electronic Media: See Section 01 00 30 - Electronic Media, for information regarding obtaining electronic documents and their limited use for purposes of project coordination and the Contractor's use in the preparation of submittals.
    a. Unless express written permission of the Architect is granted, electronic documents provided by the Architect and his consultants, shall not be used by the Contractor, or any of his subcontractors of any tier or any materials supplier or vendor as a shop drawing or any other type of submittal or as the basis for preparing such shop drawing or submittal, with the sole exception to this prohibition being that electronic documents may be used as backgrounds upon which to prepare shop drawings or other submittals.

3.10 COORDINATION DRAWINGS

A. Coordination Drawings are a special type of shop drawing prepared by various trades to show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or to function as intended.
    1. The Contractor shall arrange coordination meetings and require attendance of each (major) subcontractor in order to establish priorities for systems installation, to establish systems installation sequences, to determine and resolve potential conflicts, and to ensure that each trade has coordinated its work with the others and will honor commitments to other disciplines.
    2. Each subcontractor's representative shall sign the final coordination drawings, prior to submission for Architect's review, certifying they have coordinated each building system, resolved all potential conflicts between each trade's work and have satisfied the intent of each disciplines design.
    3. Where potential conflicts cannot be resolved without input from, or review by, the Architect, the Contractor shall request said input/review, in writing, and provide all sketches, details, part plans, etc. necessary to convey fully the essence of the situation and/or potential conflict. The Contractor and all appropriate subcontractors shall make

themselves available to meet with the Architect as required to resolve the issue(s) in question.

4. Coordination Drawings shall be required for all building structure, ductwork, and piping systems.

3.11 APPROVAL DRAWINGS

A. Whenever the Contractor or subcontractor is required to submit Shop Drawings and/or Product Data to the Authority Having Jurisdiction over the Project for review and approval of a particular component or system, prior to starting on-site work, the Contractor shall submit to the Architect two (2) copies of the approved documents including the authority stamp and approving signature. Submit as "For Information Only".

3.12 RECORD DRAWINGS

A. Record Drawings: See Section 01 78 00 - Project Close-out.

3.13 PRODUCT DATA

A. Compile Product Data into a single submittal for each element of construction or complete system. Product Data includes printed information such as manufacturer's installation instructions, catalog cuts, materials test reports, color charts, roughing-in diagrams, templates, and wiring diagrams. Mark each copy to show applicable choices and options.
   1. Identify any change, variance, or non-conformance with requirements of Contract Documents with a "cloud" and provide detailed notation including reason for each change. Provide a completed "Contractor's Substitution Request" (see Section 01 60 00).

3.14 CERTIFICATIONS

A. Certifications from manufacturers and/or installers required in individual Specification Sections shall be submitted with Product Data.
   1. In accordance with Supplementary General Conditions, Article 3, prior to Substantial Completion, the Contractor shall submit a written certificate that no asbestos and/or other hazardous substances have been incorporated into the Work of this Project.
   2. Contractor's Asbestos/Hazardous Material Certification with the following language:
      a. I, _____ the undersigned representing (company), do hereby certify that the products furnished and/or fabricated and/or installed by my firm under contract with (G.C. or C.M.) at the (Project) located in (project location) do not contain asbestos and /or other hazardous materials.
      b. Provide signature, title and date.
      c. The form of certificate shall be submitted to the Architect for review prior to use.

3.15 DELEGATED-DESIGN SUBMITTALS

A. Where professional engineering services or certifications by a professional engineer are specifically required to be provided by the Contractor, provide products and systems complying with specific performance and design criteria indicated.
   1. If criteria indicated are not sufficient to perform services or certifications required, submit a written request for additional information to the Architect.
   2. In addition to Shop Drawings, Product Data, and other required submittals, submit a certification, signed and sealed by the responsible professional engineer, licensed in the State of the Project, for each product and system specifically assigned to the Contractor to be engineered or certified by a professional engineer, indicating that the products and systems are in compliance with performance and design criteria indicated. Include a list of codes, loads, and other factors used in performing these services.

3.16 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit for review:
   1. Product data.
   2. Shop drawings.
   3. Samples for selection.
   4. Samples for verification.

B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

C. Samples will be reviewed only for aesthetic, color, or finish selection.

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below.

3.17 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit for information:
   1. Design data.
   2. Certificates.
   3. Test reports.
   4. Inspection reports.
   5. Manufacturer's instructions.
   6. Manufacturer's field reports.
   7. Other types indicated.

B. Submit for Architect's knowledge as contract administrator. No action will be taken.

3.18 SUBMITTALS FOR PROJECT CLOSEOUT

A. When the following are specified in individual Sections, submit them at project closeout:
   1. Project record documents.
   2. Operation and maintenance data.
   3. Warranties.
   4. Bonds.
   5. Other types as indicated.

B. Submit for Owner's benefit during and after project completion.

3.19 NUMBER OF COPIES OF SUBMITTALS

A. Documents for Review: Submittals to the Architect shall be electronic files in PDF format, unlocked, markable and reproducible. In addition to electronic files, the following types of submittals shall also be submitted in hard copy, quantity indicated:
   1. Steel rebar (2).
   2. Structural steel and deck (2).
   3. Doors and Frames (1).
   4. Door hardware (1).
   5. Millwork and casework (1).
   6. Sprinkler shop drawings (2).
   7. Fire alarm shop drawings (2).
   8. Small Size Sheets, Not Larger Than 11 x 17 inches.
   9. Large Size Sheets, Not Larger Than 30 x 42 inches.

B. Documents for Information: Submit three copies.

C. Samples: Confirm with the Architect the number of samples required for each submittal; one of which will be retained by Architect.
   1. After review, produce duplicates.
   2. Retained samples will not be returned to Contractor unless specifically so stated.

3.20 SUBMITTAL PROCEDURES

A. Transmit each submittal with an approved form.

B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

C. Submittal form shall include identification information: Project name, Contractor, Subcontractor or supplier; product name, pertinent drawing and detail number, and specification section number, submittal category, date, and total number of pages in the submittal.

D. Contractor's Action and Certification: The Contractor shall review each submittal, check for compliance with the Contract Documents, note corrections, note field dimension, and complete a review stamp with the following information:
   1. Contractor stamp, signed or initialed certifying that the submittal conforms to requirements of the Contract Documents in accordance with AIA A201, Paragraph 3.12.; or, Submittal deviates from requirements of the Contract Documents, with deviations clearly noted and marked with Contractor's initials; or, Contractor's substitution requested.

E. Deliver submittals to Architect at business address. Submittals may only be sent directly to the Architect's consultants by special arrangement with the Architect. Subcontractors shall not directly send submittals to the Architect.

F. Submittals of poor legibility may be returned without action.

G. Submittals not including a completed Contractor's Certification will be returned without action.

H. Submittals certified as in conformance by the Contractor and found to deviate from requirements of the Contract Documents will be returned without action.

I. The Contractor may require sub-contractors to submit similar certification, however this shall not in any way relieve the Contractor of responsibility for review and certification of all submittals.

J. All notations made on submittals by the Contractor, sub-contractors, suppliers, or fabricators shall be made in bold line type and initialed by person making the notations. Clearly indicate specified items with a "cloud" or arrows. Cross out all extraneous information not intended as part of the submission. Do NOT use highlighter or colored markings, only arrows, circles, text and the like that can be copied in black and white shall be allowed.

K. Provide a detailed notation of all deviations from the Contract Document requirements including minor variations and limitations, and the reason for each deviation. Include a Contractor's Substitution Request.

L. Schedule submittals to expedite the Project, and coordinate submission of related items.

M. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.

N. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.

O. Provide space for Contractor and Architect review stamps.

P. When revised for resubmission, identify all changes made since previous submission.

Q. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

R. Submittals not requested will not be recognized or processed.

S. Do not order materials or proceed with the Work requiring submission and review of Product Data, Shop Drawings, Samples or similar submittals prior to receiving acceptance of the submittal from the Architect.

T. The Contractor shall not use or take submittals on-site without the Architect's or the Architect's consultant's Submittal Stamp indicating acceptance. Submittals without this stamp or with a stamp indicating non-acceptance shall not be used in connection with construction.

3.21 ARCHITECT'S REVIEW

A. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Architect will review each submittal and mark to indicate action taken.
   1. In general, the Architect will strive to complete his review of submittals and return them to the Contractor in approximately two (2) weeks. Additional time may be required if large volumes of submittals are simultaneously delivered to the Architect for review. Where concurrent review of submittals by Architect's consultants, Owner, or other parties is required, allow three (3) weeks for initial review of each submittal.

2. The Architect will not review submittals of colors and finishes until submittals for all such related materials are complete and delivered for collective review. This same requirement may be extended to other components and systems as deemed appropriate by the Architect.
3. The Architect's review shall, among other limitations, not include the calculation, coordination, or verification of dimensions or quantities, which shall be the sole responsibility of the Contractor.
4. Action Stamp: The Architect will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows to indicate the action taken:
    a. Final Unrestricted Release: Where submittals are marked "No Exceptions Taken", that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents.
    b. Final-but-Restricted Release: Where submittals are marked "Note Markings" or "Comments Attached" or "Revise and Resubmit Record Copy", that part of the Work covered by the submittal may proceed provided it complies with markings / comments and requirements of the Contract Documents.
    c. Returned for Resubmittal: Where submittals are marked "Revise and Resubmit for Further Review", do not proceed with that part of the Work covered by the submittal including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat as necessary to obtain a different action mark.
    d. Rejected: When the submittal is marked "Rejected", do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Do not resubmit that product.

B. Other Action: Where a submittal is primarily for record purposes, the submittal will be returned marked "Received and Distributed for Record Only". Where a submittal cannot be reviewed due to lack of Contractor review or illegibility, for example, the submittal will be returned marked "Returned No Action".

END OF SECTION

SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. References and standards.

B. Quality assurance submittals.

C. Samples, Mock-ups and Sample Field Installations.

D. Control of installation.

E. Tolerances.

F. Testing and inspection services.

G. Manufacturers' field services.

1.02 RELATED REQUIREMENTS

A. Section 01 00 00 - General Requirements.

B. Section 01 21 00 - Allowances: Allowance for payment of testing and inspection services.

C. Section 01 30 00 - Administrative Requirements: Submittal procedures.

1.03 REFERENCE STANDARDS

A. ASTM C1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants; 2008 (Reapproved 2014).

B. ASTM C1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation; 2014.

C. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2013.

D. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2012a.

E. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2014a.

F. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2013.

1.04 SUBMITTALS

A. Contractor's Testing Agency Qualifications:
   1. Prior to start of Work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.

B. Contractor's Test Reports: After each test/inspection, promptly submit one copy of reports to Architect, Engineer, Building Official and to Owner. Information required on Test Reports shall be as identified herein for the Owner's Testing Agency.
   1. Include:
      a. Date issued.
      b. Project title and number.
      c. Name of inspector.
      d. Date and time of sampling or inspection.
      e. Identification of product and specifications section.
      f. Location in the Project.
      g. Type of test/inspection.
      h. Date of test/inspection.
      i. Results of test/inspection.
      j. Conformance with Contract Documents.

k. When requested by Architect, provide interpretation of results.

2. Test report submittals are for Architect's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.

C. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
   1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
   2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.

D. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

E. Manufacturer's Field Reports: Submit reports within 10 days of observation to Architect and Owner for their information.

F. Erection Drawings: Submit drawings to the Architect and Owner for their information.
   1. Submit for information for the sole and limited purpose of generally assessing conformance with the design intent expressed in the Contract Documents.
   2. Data indicating inappropriate or unacceptable Work may be subject to action by Architect or Owner.

1.05 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

1.06 TESTING AND INSPECTION AGENCIES

A. Quality control services include inspections, tests, and related actions including reports performed by independent agencies, governing authorities, and the Contractor. They do not include Contract enforcement activities performed by the Architect.

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

C. Specific quality control requirements for individual construction activities are specified in the Sections that specify those activities. Those requirements, including inspections and tests, cover production of standard products as well as customized fabrication and installation procedures.

D. Inspections, tests and related actions specified are not intended to limit the Contractor's quality control procedures that facilitate compliance with Contract Document requirements.

E. Requirements for the Contractor to provide quality control services as directed by the Architect, Owner, or authorities having jurisdiction are not limited by the provisions of this Section.

F. Owner will employ services of an independent testing agency to perform certain specified testing and inspection; payment for cost of services will be derived from allowance specified in Section 01 21 00; see Section 01 21 00 and applicable sections for description of services included in allowance.

G. Contractor shall employ and pay for services of an independent testing agency to perform other specified testing.

H. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

I. Testing and Inspection Agencies Quality Assurance:
   1. Testing agency: Comply with requirements of ASTM E 329, ASTM E 543, ASTM C 1021, ASTM C 1077, ASTM C 1093, and ASTM D 3740.
   2. Inspection agency: Comply with requirements of ASTM D3740 and ASTM E329.
   3. Laboratory: Authorized to operate in the State in which the Project is located.
   4. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.
   5. Testing Equipment: Calibrated at reasonable intervals either by NIST or using an NIST established Measurement Assurance Program, under a laboratory measurement quality assurance program.

1.07 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Conducted by a qualified testing agency or special inspector as required by Authorities Having Jurisdiction, as indicated in individual Specification Sections, in the Statement of Special Inspections, the Building Code of Maine, and as follows:
   1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
   2. Notifying Architect, Contractor and Owner promptly of irregularities and deficiencies observed in the Work during performance of its service.
   3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect, Owner, Contractor and to Authorities Having Jurisdiction.
   4. Submitting a final report of special tests and inspections at Substantial Completion which includes a list of unresolved deficiencies to Architect, Owner, Contractor and Authorities Having Jurisdiction.
   5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
   6. Retesting and re-inspecting corrected work.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have Work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on Shop Drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 SAMPLES, MOCK-UPS AND SAMPLE FIELD INSTALLATIONS

A. Tests shall be performed under provisions identified in this Section and identified in the respective product Specification Sections.

B. Assemble and erect specified items at full scale, with specified attachment and anchorage devices, flashings, seals, and finishes.

C. The purpose of mock-ups and sample field installations shall be to clearly establish standards of quality for the Work prior to proceeding with the Work itself. They shall be constructed in sizes, locations and quantities as directed by the Architect.

D. To the extent possible, all samples, mock-ups and sample field installations accepted by Architect shall be preserved until the Work itself has been completed and accepted by the Architect. The alteration, destruction or removal of mock-ups and sample installations shall not commence without the Architect's prior authorization.

E. The Contractor and/or his subcontractors shall construct or prepare all samples, mock-ups and sample field installations as required in individual Specification Sections or as directed by the Architect.

F. Sample field installations are full sized, fully fabricated, cured, and finished built in-place assemblies that maybe permanent if acceptable to the Architect.

G. Samples shall be clearly marked with the manufacturer's name, generic description of the sample and compliance with required standards. Where samples are for selection of color, pattern, texture, or similar characteristics from a range of standard choices, submit a full set of choices for the material or product.

H. All costs related to providing, maintaining and removing required samples, mock-ups and sample field installations shall be paid by the Contractor.

3.03 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

3.04 TESTING AND INSPECTION

A. See individual Specification Sections for testing and inspection required.

B. Testing Agency Duties:
   1. Test samples of mixes submitted by Contractor.
   2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
   3. Perform specified sampling and testing of products in accordance with specified standards.
   4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
   5. Promptly notify (within 24 hours) Owner, Architect and Contractor of observed irregularities or non-conformance of Work or products during performance of its services.
   6. Perform additional tests and inspections required by Architect.
   7. Submit written reports of all tests, inspections or other services to the Architect, Owner, Contractor and local Building Authority. Reports indicating compliant inspections shall be submitted within three (3) days. Reports shall include:
      a. Date of issue.
      b. Project name and number.
      c. Name, address, and telephone number of testing agency.
      d. Dates and locations of samples and tests or inspections.
      e. Names of individuals making tests or inspections.
      f. Designation of the Work and test method.

g. Identification of product and Specification Section.
h. Complete inspection or test data.
i. Test results and interpretations of test results.
j. Ambient conditions at time of sample taking, testing, or inspection.
k. Comments or professional opinion regarding whether inspected or tested Work complies with the Contract Documents.
l. Recommendations for re-testing.
m. Name and signature of laboratory inspector.

8. The Masonry Inspector shall submit daily Masonry Inspection Reports as prescribed in Section 04 20 00: Unit Masonry.
9. The Testing Agency shall maintain a complete deficiency list of all items not corrected and shall re-test and/or re-inspect as required after each deficiency has been corrected. All such re-testing and re-inspection shall be at the Contractor's expense. The Testing Agency shall submit a final signed report, stating whether or not all corrections have been made and the Work tested and inspected conforms to the Contract Documents.
10. Limits on Testing/Inspection Agency Authority:
    a. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
    b. Agency may not approve or accept any portion of the Work.
    c. Agency may not assume any duties of Contractor.
    d. Agency has no authority to stop the Work.

C. Owner Responsibilities:
1. The Owner will provide observations, inspections, tests and similar quality control services specified to be performed by independent agencies, except where they are specifically indicated as the Contractor's responsibility or are provided by another identified entity. The costs for Owner provided testing and inspection services shall be paid for by the Owner.
2. The Owner will employ directly an independent agency, testing laboratory, or other qualified firm to perform services that are the Owner's responsibility. Such inspections and tests may include, but shall not be limited to:
    a. Soils Analysis and Bearing Capacity.
    b. Subgrade Preparation.
    c. Soils Compaction.
    d. Bituminous Pavement Mix Design and Compaction.
    e. Concrete Reinforcement.
    f. Cast-In-Place Concrete.
    g. Mortar and Grout.
    h. Unit Masonry (testing during construction).
    i. Masonry Observation/Inspection.
    j. Structural Steel, Steel Joist and Steel Deck.
    k. Fireproofing.
    l. Firestopping.
    m. Substrate moisture testing for finishes.
    n. Special Inspections per Section 01 45 33.
    o. Other testing specified to be by Owner required under individual Specification Sections.

D. Contractor Responsibilities:
1. The Contractor shall provide inspections, tests and similar quality control services, specified in individual Specification Sections, except where they are specifically indicated to be the Owner's responsibility, or are provided by another identified entity. Costs for these services shall be included in the Contract Sum.
2. The Contractor shall employ and pay an independent testing agency to perform quality control services, including but not limited to inspections, sampling and tests required for determining the suitability of materials prior to delivery to the site and other services as

specified in the Specification Sections. Such inspections and tests shall include, but may not be limited to the following:

a. Analysis of loam.
b. Off-site borrow.
c. Concrete mix designs and pre-construction tests.
d. Pre-construction unit masonry testing.
e. Sealant testing.
f. Elevator and Lifts.
g. Electrical systems.
h. HVAC systems.
i. Piping systems.
j. Where the Owner has engaged a testing agency or other entity for testing and inspection of a part of the Work and the Contractor is also required to engage an entity for the same or related element, the Contractor shall not employ the entity engaged by the Owner, unless otherwise agreed in writing with the Owner.

3. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
4. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
5. Provide incidental labor and facilities:
   a. To provide access to Work to be tested/inspected.
   b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
   c. To facilitate tests/inspections.
   d. To provide storage and curing of test samples.
6. Notify Owner's Representative, Architect and laboratory sufficiently in advance of operations to allow for the proper assignment of personnel and scheduling of tests and inspections.
7. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

E. Re-testing:
1. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect.
2. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.
3. The Contractor is responsible for re-testing where results of required inspections, tests or similar services prove unsatisfactory and do not indicate compliance with the Contract Document requirements, regardless of whether or not the original test was the Contractor's responsibility. Cost of re-testing construction revised or replaced by the Contractor is the Contractor's responsibility.

3.05 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.

B. Report in writing, observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.06 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not conforming to specified requirements.

B. If, in the opinion of Architect, it is not practical to remove and replace the Work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 45 33
CODE-REQUIRED SPECIAL INSPECTIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Code-required special inspections.

B. Testing services incidental to special inspections.

C. Submittals.

1.02 RELATED REQUIREMENTS

A. Section 01 21 00 - Allowances: Allowance for payment of testing services.

B. Section 01 30 00 - Administrative Requirements: Submittal procedures.

C. Section 01 40 00 - Quality Requirements.

D. Section 01 60 00 - Product Requirements: Requirements for material and product quality.

1.03 DEFINITIONS

A. Code or Building Code: 2009 Edition of the International Building Code and, more specifically, Chapter 17 - Structural Tests and Inspections, of same.

B. Authority Having Jurisdiction (AHJ): Agency or individual officially empowered to enforce the building, fire and life safety code requirements of the permitting jurisdiction in which the Project is located.

C. Special Inspection:
   1. Special inspections are inspections and testing of materials, installation, fabrication, erection or placement of components and connections mandated by the AHJ that also require special expertise to ensure compliance with the approved contract documents and the referenced standards.
   2. Special inspections are separate from and independent of tests and inspections conducted by Owner or Contractor for the purposes of quality assurance and contract administration.

1.04 REFERENCE STANDARDS

A. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.

B. ACI 530/530.1/ERTA - Building Code Requirements and Specification for Masonry Structures and Related Commentaries; 2011.

C. AISC 341 - Seismic Provisions for Structural Steel Buildings; 2010.

D. AISC 360 - Specification for Structural Steel Buildings; 2010.

E. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2014.

F. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field; 2012.

G. ASTM C172/C172M - Standard Practice for Sampling Freshly Mixed Concrete; 2010.

H. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2012a.

I. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2014a.

J. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2013.

K. ASTM E605 - Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members; 1993 (Reapproved 2011).

L. ASTM E736 - Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members; 2000 (Reapproved 2011).

M. ASTM E2570 - Standard Test Methods for Evaluating Water-Resistive Barrier (WRB) Coatings Used under Exterior Insulation and Finish Systems (EIFS) or EIFS with Drainage; 2007.

N. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2010 w/Errata.

O. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2008.

P. AWS D1.4/D1.4M - Structural Welding Code - Reinforcing Steel; 2011.

Q. IAS AC89 - Accreditation Criteria for Testing Laboratories; 2010.

R. IAS AC291 - Accreditation Criteria for Special Inspection Agencies; 2012.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Special Inspection Agency Qualifications: Prior to the start of work, the Special Inspection Agency shall:
   1. Submit agency name, address, and telephone number, names of full time registered Engineer and responsible officer.
   2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
   3. Submit certification that Special Inspection Agency is acceptable to AHJ.
   4. Submit documentation that Special Inspection Agency is accredited by IAS according to IAS AC291.

C. Testing Agency Qualifications: Prior to the start of work, the Testing Agency shall:
   1. Submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
   2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
   3. Submit certification that Testing Agency is acceptable to AHJ.
   4. Submit documentation that Testing Agency is accredited by IAS according to IAS AC89.

D. Special Inspection Reports: After each special inspection, Special Inspector shall promptly submit two copies of report; one to Architect and one to the AHJ.
   1. Include:
      a. Date issued.
      b. Project title and number.
      c. Name of Special Inspector.
      d. Date and time of special inspection.
      e. Identification of product and specifications section.
      f. Location in the Project.
      g. Type of special inspection.
      h. Date of special inspection.
      i. Results of special inspection.
      j. Conformance with Contract Documents.
   2. Final Special Inspection Report: Document special inspections and correction of discrepancies prior to the start of the work.

E. Fabricator Special Inspection Reports: After each special inspection of fabricated items at the Fabricator's facility, Special Inspector shall promptly submit two copies of report; one to Architect and one to AHJ.
   1. Include:
      a. Date issued.
      b. Project title and number.
      c. Name of Special Inspector.

d. Date and time of special inspection.
e. Identification of fabricated item and specification section.
f. Location in the Project.
g. Results of special inspection.
h. Verification of fabrication and quality control procedures.
i. Conformance with Contract Documents.
j. Conformance to referenced standard(s).

F. Test Reports: After each test or inspection, promptly submit two copies of report; one to Architect and one to AHJ.
1. Include:
a. Date issued.
b. Project title and number.
c. Name of inspector.
d. Date and time of sampling or inspection.
e. Identification of product and specifications section.
f. Location in the Project.
g. Type of test or inspection.
h. Date of test or inspection.
i. Results of test or inspection.
j. Conformance with Contract Documents.

G. Certificates: When specified in individual special inspection requirements, Special Inspector shall submit certification by the manufacturer, fabricator, and installation subcontractor to Architect and AHJ, in quantities specified for Product Data.
1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

1.06 SPECIAL INSPECTION AGENCY

A. Owner or Architect will employ services of a Special Inspection Agency to perform inspections and associated testing and sampling in accordance with ASTM E329 and required by the building code.

B. The Special Inspection Agency may employ and pay for services of an independent testing agency to perform testing and sampling associated with special inspections and required by the building code.

C. Employment of agency in no way relieves Contractor of obligation to perform work in accordance with requirements of Contract Documents.

1.07 TESTING AND INSPECTION AGENCIES

A. Owner or Architect may employ services of an independent testing agency to perform additional testing and sampling associated with special inspections but not required by the building code.

B. Employment of agency in no way relieves Contractor of obligation to perform work in accordance with requirements of Contract Documents.

1.08 QUALITY ASSURANCE

A. Special Inspection Agency Qualifications:
1. Independent firm specializing in performing testing and inspections of the type specified in this section.
2. Accredited by IAS according to IAS AC291.

B. Testing Agency Qualifications:
1. Independent firm specializing in performing testing and inspections of the type specified in this section.
2. Accredited by IAS according to IAS AC89.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

Statement of Special Inspections May 27, 2015
Park Danforth

Project Name	Park Danforth	
Location:	777 Stevens Avenue Portland, Maine, 04103	
Owner:	The Park Danforth Denise M. Vachon, CEO 777 Stevens Avenue Portland, Maine 04103	Tel: 207-797-7710
Architect of Record (AoR): & Registered Design Professional in Responsible Charge (RDPiRC):	Richard Pizzi, CEO Lavallee Brensinger Architects 155 Dow St. Manchester, NH	Tel: 603-622-5450
Structural Engineer of Record (SER):	Daniel Burne, Associate Becker Structural Engineers, Inc 75 York Street, Portland, Maine 04101	Tel: 207-879-1838
Testing Agency(s) (TA):	TO BE DETERMINED	
Geotechnical Engineer (GE):	Timothy J. Boyce, P.E. S.W. Cole Engineering Inc 286 Portland Road, Gray, ME	Tel (207) 657-2866
Specialty Engineer(s) (SE):	See Performance Specifications on Page 2	

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 International Building Code, 2009 edition.

The firms, agencies, or individuals noted above (hereafter referred to collectively as agents) will perform the structural tests and inspections as specified herein.

The complete set of Contract Documents (Drawings and Specifications) that accompany the application for building permit is to be considered attached to this program as reference material.

This program does not relieve the Contractor of their responsibility to conduct the work in accordance with the requirements of the Construction Documents, the approved Shop Drawings and the Maine Uniform Building and Energy Code "MUBEC" (2009 International Building Code – IBC, Amended).

Construction Categories: The following construction categories are included in the Statement of Special Inspections for this Project. Specific tests and inspections required for each designated category are listed on the page noted opposite the category.

Performance Specifications: The following construction components are designated in the Contract Documents on the basis of a performance specification to be designed by the Contractor's or Subcontractor's registered professional engineer, i.e. Specialty Engineer - SE.

Reports: Test and inspection reports prepared by the AOR, SER, TA, GE, and SE will be collected and maintained by the RDPiDC and distributed, according to the procedures established by the Building Official. Prior to the issuance of a certificate of occupancy the RDPiDC will submit a final report to the Owner and Building Official in accordance with the Building Code.

Prepared by the SER:

Name: Daniel Burne, P.E.
Maine P.E. Registration # 10910 (Structural)

Signature: _____

Firm: Becker Structural Engineers, Inc.

Date: _____

Registered Design Professional in Responsible Charge:

Name: Richard Pizzi, AIA
Maine Registered Architect # 3807

Signature: _____

Firm: Lavallee Brensinger Architects

Date: _____

Steel Construction (IBC 2009 Section 1704.3) (Specification Sections 051200, 052100 & 053100)					
Item	Tests / Inspections	Code, Standard, or Document Reference	Agency	Type of Inspection[1,2,3]	Frequency
1. Steel Construction QC Review	• Review Contractor's field quality control procedures. • Review frequency and scope of field testing and inspections.	Spec. Section 051200	SER	-	Each submittal
2. Fabricator and Erector Certifications	• Review AISC Certified Fabricator and AISC Certified Erector Submittals.	AISC (Fabricator) Certification Standard for Steel Building Structures (STD) and AISC Certified Steel Erector (CSE)	SER	-	Each submittal
	• For record and use in field verification		TA	Periodic	In conjunction with related field visits
3. Materials	• Review material certifications for conformance to Specifications.	AISC 360 A3.1 AISC 360 A3.3 & 3.4 Spec. Section 051200	SER	-	Each submittal
	• For record and use in field verification		TA	Periodic	In conjunction with related field visits
4. Anchor Rods	• Review Contractor's as-built survey. • Verify that all anchor rods have been properly torqued and have adequate fit-up.	ASTM F1554 AISC 360 M4 Spec. Section 051200	TA	Periodic	Verify bolt length, projection and condition. Verify "Snug tight" torque for 100% of anchor bolts in braced bays, 20% in all other cases.
5. Bolting	• Verify bolt size and grade. • Test and inspect bolted connections.	AISC 360 A3.3 & M2.5 Spec. Section 051200 AISC Specification for Structural Joints Using A325 or A490 Bolts	TA	Continuous (Slip-critical) Periodic (Bearing)	As appropriate for connection type and fastener type. Per Contract Documents and AISC specifications.
			SER	-	During aperiodic site visits
6. Welding	• Check welder qualifications. • Check weld identification markings. • Test and inspect welds.	AWS D1.1 Section 6 Spec. Section 051200	TA	<u>Continuous:</u> •Complete and partial penetration groove welds, •Multiple pass fillet welds, •Plug and slot welds •Single pass fillet welds >5/16" <u>Periodic:</u> •Fillet welds ≤ 5/16"	<u>At moment connections:</u> Visually inspect and test all welds by ultrasonic or radiographic methods. If for an individual welder, the rejection rate is demonstrated to be five (5) percent or less, the non-destructive testing rate may be reduced to twenty-five (25) percent for the individual welder. The evaluation of the welding shall be based on a sampling of at least forty (40) completed welds. <u>At all other welds:</u> Visually inspect all welds and test as required by magnetic particle, ultrasonic or radiographic methods.

7. Shear Connectors	• Check against Construction Documents and latest approved shop drawings. • Inspect shear connectors for size, quantity, and location. • Test shear connectors for proper weld attachment.	AWS D1.1 Section 7 Construction Documents Spec. Section 051226	TA	Periodic	Test a minimum of 10% of shear connectors; if one or more fail, then test all shear connectors.
			SER	-	During aperiodic site visits
8. Structural Framing, Details, and Assemblies	• Check against Construction Documents and latest approved shop drawings. • Inspect for size, grade of steel, camber, installation, and connection details. • Verify steel frame joint details including: • Details such as bracing and stiffeners • Moment connections • Joint configurations and locations • Preparation of faying surfaces	Construction Documents Spec. Section 051200	TA	Periodic	All framing,details, and assemblies.
			SER	-	During aperiodic site visits
9. Expansion & Adhesive Anchors	• Review installation procedures for both mechanical anchors and adhesive anchors. • Verify that materials are suitable for job conditions.	ACI 318 Appendix D Anchor manufacturer's instructions	TA	Periodic	All anchors
			SER	-	Each submittal
10. Steel Decking	• Verify gage, depth, and type. • Inspect placement, laps, welds, side lap attachments, and mechanical fasteners • Check welder qualifications.	SDI Steel Deck Design Manual AWS D1.3 Section 7 Construction Documents Spec. Section 053100	TA	Periodic	All decking and connections
			SER	-	During aperiodic site visits
11. Field Correction of Fabricated Items	• Review documentation of approved repairs and verify completion of repairs.	Construction Documents Spec. Section 051200	TA	As required, per above	Each repair
			SER	-	During aperiodic site visits

[1]Continuous Inspection: Full-time observation of the indicated work by approved individual of the noted Agency, as the work is being performed.

[2]Periodic Inspection: Part-time or periodic observation of the indicated work by an approved individual of the noted Agency and an inspection of the completed work.
[3]Aperiodic Inspection: Irregularly scheduled as required or as needed observation of the indicated work by an approved individual of the noted Agency.

Concrete Construction (IBC 2009 Section 1704.4) (Specification Section 033000)					
Item	Tests / Inspections	Code, Standard, or Document Reference	Agency	Type of Inspection[1,2,3]	Frequency
1. Cast in Place Concrete Construction QC Review	• Review Contractor's field quality control procedures. • Review frequency and scope of field testing and inspections.	Construction Documents Spec. Section 033000	SER	-	Each submittal
2. Mix Design	• Review mix designs prior to placement.	Construction Documents Spec. Section 033000	SER	-	Each submittal
	• Verify use of approved mix design.	ACI 318, 1.3.2.A ACI 318, Chapter 4 ACI 318, 5.2-5.4	TA	-	Each concrete placement
3. Materials	• Review material certifications for conformance to Specifications.	Construction Documents Spec. Section 033000	SER & TA	-	Each submittal
4. Batching Plant	• Review plant quality control procedures and batching/mixing methods.	ACI 304	TA	-	One (1) visit at the start of production & one (1) during the production period. Additional visits may be requested by the SER, if necessary.
5. Reinforcement Installation	• Use latest set of approved reinforcing bar shop drawings. • Inspect reinforcing for grade, size, quantity, spacing, lap lengths, bends, hooks, condition, and placement. • Verify adequate cover per specifications. • Confirm dowel installation for masonry and concrete, including embedment lengths.	ACI 318, 1.3.2.C ACI 318, 7.5	TA	Periodic	Each concrete placement
			SER	-	During aperiodic site visits
6. Anchor Rods	• Inspect anchor rods prior to and during placement of concrete.	ACI 318 1.3.2.C	TA	Continuous	All anchor rods
			SER	-	During aperiodic site visits
7. Formwork	• Inspect forms for cleanliness and for proper sizes/locations of concrete members.	ACI 318 6.1.1	TA	Periodic	Each concrete placement
			SER	-	During aperiodic site visits

8. Concrete Placement and Sampling of Fresh Concrete	• Review hot-weather and cold-weather placement procedures submitted by the Contractor.	ACI 305ACI 306	SER	-	Each submittal
	• Verify conformance to Specifications including hot-weather and cold-weather placement procedures.	ACI 305 ACI 306	TA	-	Each concrete placement
	• Observe concrete placement operations. • Check that total water does not exceed amount in design mix.	ACI 318, 1.3.2.D ACI 318, 5.9-5.10	TA	Continuous	Each concrete delivery
			SER	-	During aperiodic site visits
	• Concrete Strength	ASTM C31, C39 & C172	TA	-	For each strength of concrete, each day, take six (6) standard 6"x12" cylinders for the first placement up to 50 CY. Then take six (6) additional cylinders for every 50 CY thereafter. Take sample from point of discharge and at time fresh concrete is placed. Concrete for each set of cylinders shall be from (1) representative sample of the entire batch.
	• Concrete Slump	ASTM C143			
	• Concrete Air Content	ASTM C231			
	• Concrete Temperature	ASTM C1064			
9. Evaluation of Concrete Strength	• Test and evaluate in accordance with the Specifications.	Construction Documents Spec. Section 033000 ACI 214 ASTM C42	TA	-	(2) 7-day & (2) 28-day results. Hold (2) for 56-day results, as needed.
			SER	-	Each submittal
10. Curing and Protection	• Observe procedures for conformance to the Specifications.	Construction Documents Spec. Section 033000	TA	Periodic	Each concrete placement
			SER	-	During aperiodic site visits
11. Mechanical Reinforcing Splices	• Confirm that the correct, approved couplers are being used. • Verify proper embedment, joint fit-up, and tightness of mechanical parts.	ACI 318, Chapter 12 & Manufacturer's installation instructions	TA	Periodic	Visual inspection of all splices

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Masonry Construction (IBC 2009 Section 1704.5) (Specification Section 042000)					
Item	Tests / Inspections	Code, Standard, or Document Reference	Agency	Type of Inspection[1,2]	Frequency
1. Tests Submitted by Contractor for Masonry Units/ Assemblages	• Review mortar, grout, and prism tests submitted by Contractor.	Construction Documents Spec. Section 042000 ACI 530.1 Art. 1.5	SER	-	Each class of masonry unit and type of masonry assemblage.
2. Materials Certification	• Review masonry units, masonry veneers, precast masonry units, and mortar and grout materials.	Construction Documents Spec. Section 042000 ACI 530.1 Art. 1.4B	SER	-	Each submittal
	• For record and field verification		TA		In conjunction with related field visits
3. Testing & Evaluation of Mortar & Grout Strength	• Sample and test mortar and grout used in field for masonry construction.	Construction Documents Spec. Section 042000 ACI 530.1 Art. 1.4B	TA	-	For each type of mortar and grout, per every 5,000 square feet of wall surface area: test mortar per ASTM C780 test grout per ASTM C1019
	• Review test results for mortar and grout.		SER	-	Each report
4. Proportioning , Mixing, and Consistency of Mortar & Grout	• Observe field procedures for proportioning and mixing of the mortar and grout to be used in the masonry construction.	Construction Documents Spec. Section 042000 ACI 530.1 Art. 2.6	TA	Continuous	Once, for each type of grout, at the beginning of masonry construction
			SER	-	During aperiodic site visits
5. Masonry Installation	• Inspect and report on installation of masonry units for general configuration and placement.	Construction Documents Spec. Section 042000 ACI 530.1 Art. 3.3	TA	Periodic	All locations
			SER	-	During aperiodic site visits
6. Anchorage	• Inspect type, spacing, and placement of masonry anchors and ties.	ACI 530 Sections 1.2.2.e & 1.16.1	TA	Periodic	All locations
			SER	-	During aperiodic site visits
7. Reinforcement Installation	• Inspect reinforcement for grade, size, quantity, spacing, condition, cover, bar positioners, and placement.	Construction Documents Spec. Section 042000 ACI 530 Section 1.15 ACI 530.1 Art. 2.4 & 3.4	TA	Periodic	All locations
			SER	-	During aperiodic site visits
8. Grouting Operations	• Inspect cells of masonry units for cleanliness prior to grouting. Observe partial/full grouting procedures.	Construction Documents Spec. Section 042000 ACI 530.1 Art. 2.6B	TA	Continuous	All locations
			SER	-	During aperiodic site visits
9. Weather Protection	Review submittal on protection of masonry against cold and hot weather.	IBC Sections ACI 530.1 Articles 1.8C & 1.8D	SER	-	Each submittal
	• Observe protection of masonry against cold and hot weather.		TA	Periodic	Each masonry placement
10. Anchorage of Exterior Wall Masonry Veneer	• Inspect type, size, spacing, and placement of approved anchorage to adjacent back-up framing.	Construction Documents Spec. Section 042000 ACI 530 Section 1.2.2.e	TA	Periodic	All locations
			SER	-	Each submittal

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Soils (IBC 2009 Section 1704.7) (Specification Section 31 23 15)					
Item	Tests / Inspections	Code, Standard, or Document Reference	Agency	Type of Inspection[1,2,3]	Frequency
1. Excavation	• Review existing sub-soils and groundwater conditions during building excavation.	Construction Documents Spec. Section 320000	GE	Periodic	At each location
2. Bearing Strata	• Review the in-situ bearing strata and compacted structural fill bearing strata for footings and slabs cast on grade.	Construction Documents Spec. Section 320000	GE	Periodic	At each location
3. Structural Fill	• Observe and test compacted structural fill.	Construction Documents Spec. Section 320000	TA	Continuous	At each location
4. Field Conditions	• Review existing conditions, procedures and in-situ bearing strata for underpinning.	Construction Documents Spec. Section 314000	GE	Continuous	At each location
5. Concrete Placement	• Observe concrete placement operations.	Construction Documents Spec. Sections 033000 & 314000	TA	Periodic	See Concrete Construction Requirements

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Fire-resistant Materials Specification Section 07 81 00 and 07 81 23. (IBC 2009 Sections 1704.12 & 1704.13)					
Item	Tests / Inspections	Code, Standard, or Document Reference	Agency	Type of Inspection[1,2]	Frequency
1. Materials Certification	Review materials certifications for conformance to Specifications	IBC 1704.12, 1704.13 Spec. Section 078100 and 078123 ASTM E605 ASTM E736	AOR	-	Each submittal
	For record and use in field verification		TA	Periodic	In conjunction with related field visits
2. Sprayed Fire-resistant Materials	• Inspect and test sprayed fire-resistant materials applied to floor/roof assemblies and structural members in accordance with ASTM E605 and ASTM E736, based on the fire-resistance design as designated in the Construction Documents. Inspections shall include: • Condition of substrates • Thickness of application • Density • Bond strength adhesion/cohesion • Condition of finished application	IBC 1704.12 Spec. Section 078100 ASTM E605 ASTM E736	TA	Periodic	Floor & Roof Assemblies: • Thickness: 4 measurements per 1,000 square feet of sprayed area of each assembly at each story •Density: 1 measurement per 2,500 square feet of sprayed area of each assembly at each story •Bond Strength: 1 measurement per 2,500 square feet of sprayed area of each assembly at each story Structural Members: • Thickness: 25 percent of the structural members at each story • Density: 1 measurement per 2,500 square feet of sprayed area of each type of member at each story • Bond Strength: 1 measurement per 2,500 square feet of sprayed area of each type of member at each story
3. Mastic and Intumescent Fire-resistant Coatings	• Inspect coatings applied to structural elements in accordance with AWCI 12-B, based on the fire-resistance design as designated in the Construction Documents.	IBC 1704.13 Spec.Section 078123 AWCI 12-B	TA	Periodic	At all locations

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Glazed Aluminum Curtain Walls (IBC 2009 Section 1704.15) (Specification Section 084410)					
Item	Tests / Inspections	Code, Standard, or Document Reference	Agency	Type of Inspection[1,2]	Frequency
1. Glazed Aluminum Curtainwalls	• Review Specialty Engineer's performance design criteria used in structural design of system.	Construction Documents Spec. Section 084410	SER	-	Each submittal
2. Material Certification	• Review materials used. • For record and use in field verification.	Construction Documents Spec. Section 084410	TA	-	In conjunction with related field visits
3. Installation of Glazed Aluminum Curtainwalls	• Inspect type, size, gauge, spacing, and placement of members for conformance to the approved Curtain Wall Shop Drawings and Contract Documents. • Inspect member-to-member connections and connections/ anchorage to adjacent steel/concrete/wood support elements.	Construction Documents Spec. Section 084410 Manufacturer's installation instructions	TA	Periodic	All locations
			SE	-	Once during performance of the work and once after completion of the work

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[2]Periodic Inspection: Part-time or intermittent observation of the indicated work by an approved individual of the noted Agency and an inspection of the completed work.

Stairs and Railings (IBC 2009 Section 1704.15) (Specification Section 055100)					
Item	Tests / Inspections	Code, Standard, or Document Reference	Agency	Type of Inspection[1,2,3]	Frequency
1. Steel Stairs & Handrail/Guardrail Assemblies	• Review Specialty Engineer's performance design criteria used in structural design of stair pans, stringers, landings, and railings.	Construction Documents Spec. Section 055100	SER	-	Each submittal
2. Materials Certification	• Review certification of materials.	Construction Documents Spec. Section 055100	SER	-	Each submittal
	• For record and field verification.	Construction Documents Spec. Section 055100	TA	Periodic	All locations
3. Installation of Steel Stairs & Handrail/ Guardrail Assemblies	• Inspect installation of steel stairs. • Check component type, size, spacing, and placement for conformance with the approved stair system design. • Check member-to-member connections and connections to adjacent steel/concrete support elements.	AWS D1.1 AISC 360 NAAMM Metal Stair Manual Construction Documents Spec. Section 055100	TA	Periodic	All locations
			SE	-	Once during performance of the work and once after completion of the work
			SER	-	During aperiodic site visits

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Cold Formed Metal Framing Construction (IBC 2009 Section 1704.3) (Specification Section 054000)					
Item	Tests / Inspections	Code, Standard, or Document Reference	Agency	Type of Inspection[1,2]	Frequency
1. Cold Formed Metal Exterior Wall Stud Backup Framing Design and Cold Formed Metal Roof Truss Design	• Review Specialty Engineer's performance design criteria used in structural design of cold formed metal exterior wall stud backup framing and cold formed metal roof trusses.	Construction Documents Spec. Section 054000	SER	-	Each submittal
2. Materials Certification	• Review certification of materials. • For record & field verification	AISI Cold Formed Steel Design Manual Construction Documents Spec. Section 054000	TA		In conjunction with related field visits
3. Installation of Cold Formed Metal Exterior Wall Stud Backup Framing and Cold Formed Metal Roof Trusses	• Inspect type, size, gauge, spacing and placement of cold formed metal exterior wall studs, connections, anchorage, bridging, accessories, etc. for conformance with the approved Shop Drawings and Contract Documents.	AISI Cold Formed Steel Design Manual Construction Documents Spec. Section 054000	TA	Periodic	All locations
			SE	-	Once during performance of the work and once after completion of the work

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[2]Periodic Inspection: Part-time or intermittent observation of the indicated work by an approved individual of the noted Agency and an inspection of the completed work.

Firestopping (IBC 2009 Section 110.3.63) (Specification Section 07 84 00) USE ONLY IF AHJ REQUIRES 3RD PARTY INSPECTION					
Item	Tests / Inspections	Code, Standard, or Document Reference	Agency	Type of Inspection[1,2]	Frequency
1. Material Certification. Test data for each firestop assembly	Review for conformance with the Contract Documents	Construction Document Spec. Section 07 84 00	TA	-	Each submittal
2. Installer certification	Review of installer qualifications	Construction Document Spec. Section 07 84 00	TA	-	Once
3. Installation of firestopping	Inspect type, materials, thickness, adhesion of firestopping assemblies for all joints and penetrations in fire-resistance-rated assemblies, smoke barriers, and smoke partitions prior to concealment from view. Verify proper in-place labeling.	Construction Document Spec. Section 07 84 00	TA	Continuous	100% of all applicable items.

[1]Continuous Inspection: Full-time observation of the indicated work by approved individual of the noted Agency, as the work is being performed.

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SECTION 01 50 00
TEMPORARY FACILITIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary utilities.

B. Temporary telecommunications services.

C. Temporary sanitary facilities.

D. Temporary Controls: Barriers, enclosures, and fencing.

E. Security requirements.

F. Vehicular access and parking.

G. Waste removal facilities and services.

H. Project identification sign.

I. Field offices.

1.02 RELATED REQUIREMENTS

A. Section 01 00 00 - General Requirements.

B. Section 01 40 00 - Quality Requirements.

1.03 REFERENCE STANDARDS

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2014.

B. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.

1.04 QUALITY ASSURANCE

A. Comply with NFPA 241 Building Construction and Demolition Operations, ANSI A10 Safety Requirements for Construction and Demolition, AGC and ASC industry recommendations, and other applicable standards.
   1. Temporary electrical service shall comply with NECA Temporary Electrical Facilities, NEMA, UL and NFPA 70 National Electric Code.

B. At the earliest time, when acceptable to the Owner, change over room use of temporary service to use of the permanent service.

C. Operate temporary service and facilities in a safe and efficient manner, taking necessary fire prevention measures.

1.05 TEMPORARY UTILITIES

A. Provide and pay for all drainage and stormwater, electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes.

B. Existing facilities may not be used.

C. New permanent facilities may not be used.

D. Use trigger-operated nozzles for water hoses, to avoid waste of water.

1.06 TELEPHONE SERVICES

A. Provide, maintain, and pay for telephone service to field office at time of Project mobilization.

B. Telecommunications services shall include:
   1. Personal computer dedicated to project telecommunications, with necessary software and laser printer.
   2. Telephone Land Lines: One line, minimum; one handset per line.
   3. Internet Connections: Minimum of one; DSL modem or faster.

4. Email: Account/address reserved for project use.

1.07 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

B. Maintain daily in clean and sanitary condition.

1.08 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.

C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

D. Traffic Controls.

1.09 FENCING

A. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.10 EXTERIOR ENCLOSURES

A. Provide temporary insulated weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.11 INTERIOR ENCLOSURES

A. Provide temporary partitions and ceilings as required to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.

B. Construction: Framing and gypsum board sheet materials with closed joints and sealed edges at intersections with existing surfaces:
   1. STC rating of 35 in accordance with ASTM E90.
   2. Maximum flame spread rating of 75 in accordance with ASTM E84.

C. Paint surfaces exposed to view from Owner-occupied areas.

1.12 SECURITY

A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

B. Coordinate with Owner's security program.

1.13 VEHICULAR ACCESS AND PARKING

A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.

B. Coordinate access and haul routes with governing authorities and Owner.

C. Provide and maintain access to fire hydrants, free of obstructions.

D. Provide means of removing mud from vehicle wheels before entering streets.

E. Designated existing on-site roads may be used for construction traffic.

F. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

1.14 WASTE REMOVAL

A. See Section 01 74 19 - Waste Management, for additional requirements.

B. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

C. Provide containers with lids. Remove trash from site periodically.

D. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

F. Secure waste receptacles within construction areas to prohibit unauthorized access or use.

1.15 PROJECT IDENTIFICATION

A. Provide project identification sign.

B. Erect on site at location approved by Owner and governing authorities.

C. No other signs are allowed without Owner permission except those required by law.

D. Size: 8' x 4' (unless otherwise required by local authorities) The Contractor shall be required to furnish and erect the Project sign complete in all respects, and to dismantle when so instructed by the Owner.

E. Content: Display names and addresses of the Project, Owner, Architect, and Contractor. Graphics, text, lettering, colors, and location shall be provided by the Architect and approved by the Owner, at a later date.

F. Temporary Signs: Prepare signs to provide directional information to construction personnel and visitors. Do not permit installation of unauthorized signs. No other signs or advertisements shall be displayed on the premises without the approval of the Owner.

1.16 FIELD OFFICES

A. The Contractor shall provide and maintain an insulated, weather tight, field office at the site. The office shall be of sufficient size to accommodate required office personnel and meeting place for six people. Provide electrical service, heat, lighting, telephone, fax machine, and personal computer, Internet connected with e-mail capability and printer. At a minimum, furnish with a desk and chair for each Superintendent, conference table and chairs, 4-drawer file cabinet, plan table, plan rack, and bulletin board. Equip with a water cooler and first aid cabinet unit. Existing facilities and/or new construction shall not be available for this purpose.

B. Temporary offices shall be maintained until the issuance of a Certificate of Substantial Completion and shall be removed when no longer required. The Contractor shall pay all costs in connection with the construction, servicing, maintenance, and removal of temporary offices.

C. Provide space for Project meetings, with table and chairs to accommodate 6 persons.

D. Locate offices a minimum distance of 30 feet from existing and new structures.

E. Verify location of offices with Owner.

1.17 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.

B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore existing facilities used during construction to original condition.

E. Restore new permanent facilities used during construction to specified condition.

PART 2 PRODUCTS

2.01 PRODUCTS

A. Tarpaulins: Waterproof, fire-resistant, UL labeled, with flame spread rating of 15 or less.

B. Water: Potable water.

C. Fencing: Shall be galvanized two (2) inch chain link fabric not less than six (6) feet high with galvanized steel pipe posts.

PART 3 EXECUTION

3.01 GENERAL

A. Review locations of temporary facilities, equipment, and storage with the Architect and Owner, for the Owner's approval.

B. Use qualified personnel for the installation of temporary facilities. Do not remove until facilities are no longer needed, or are replaced by authorized use of completed permanent facilities.

3.02 TEMPORARY UTILITY INSTALLATION

A. Temporary Water Service: The Contractor shall:
   1. Provide and maintain a temporary water service, or install the permanent water service as required for the proper execution of the Work. Such service shall be installed in a manner approved by governing authorities.
   2. Pay for the installation and removal of any temporary service, and for all water used throughout the construction period.
   3. Pay for permits, if applicable, as required by governing authorities. Obtain easements across private property if required.
   4. Extend a supply adequate for all construction purposes and convenient to all trades.
   5. Protect lines against freezing and be fully responsible for the temporary installation in every way.
   6. Provide backflow preventer(s), vacuum breakers, etc., as required to protect water systems from contamination.
   7. Provide any and all hose needed. All service hoses shall be bubble-tight at all times. Trigger operated nozzles shall be used to reduce water waste. No leakage shall be acceptable. Remove all temporary equipment and materials completely upon completion of construction.
   8. Repair all damage caused by use of temporary or permanent water services.

B. Temporary Electrical Services: The Contractor shall:
   1. Provide and maintain temporary light and power as required for the proper execution of the Work. Such service shall be installed and maintained in conformance with NEMA, NECA, UL standards for temporary electric service, National Electric Code and in a manner approved by governing authorities and local utility regulations.
   2. Pay for the installation and removal of any temporary service, and for all electricity used throughout the construction period.
   3. Pay for permits, if applicable, as required by governing authorities. Obtain easements across private property if required.
   4. Extend a supply of temporary lighting and power adequate for all construction purposes and convenient to all trades.
   5. Accept full responsibility for the temporary installation in every way. Remove all temporary equipment and materials completely upon completion of construction.
   6. Whenever overhead floor or roof deck has been installed, provide temporary lighting with local switching. Install and operate temporary lighting that will fulfill security and protection requirements, without operating the entire system, and will provide adequate illumination for construction operations and traffic conditions. Provide a minimum of one (1) lamp per story at interior stairways and ladder runs, located to illuminate each landing and flight.

7. Determine that construction use of power will not affect the operation or performance of any equipment or appliances within the existing building.

C. Temporary Drainage and Storm Water Control: The Contractor shall provide drainage ditches, dry wells, stabilization ponds, and similar facilities. Filter out excessive amounts of soil, construction debris, chemicals, oils and similar contaminants that might clog sewers or pollute waterways before discharge. Maintain temporary drainage facilities in a clean, sanitary condition. Following heavy use, restore normal conditions promptly. Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of storm water from heavy rains. Protect site from puddling or running water. Provide water barriers as required to protect site and abutting properties from soil erosion.

D. Sanitary Facilities: The Contractor shall provide and maintain in a sanitary condition temporary toilets, wash facilities and drinking water fixtures complying with regulations and health codes for the type, number, location, operation and maintenance of fixtures and facilities.
   1. Toilets shall be enclosed, weather-tight chemical type for the use of all construction personnel at locations acceptable to the Owner and governing authorities. Toilet facilities within existing buildings may not be used by construction personnel. Permanent toilets installed under this Contract shall not be used during construction.
   2. Drinking water facilities shall be containerized tap-dispenser bottled water units, with paper cups.
   3. Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Provide covered waste container for used materials. Maintain daily in clean and sanitary condition.

E. Temporary Heat: The Contractor shall provide temporary heat to permit construction work to be carried on during the winter months and as required by construction activities for curing or drying of completed installations or protection of installed construction from adverse effects of low temperatures or high humidity. These Specifications are not to be construed as requiring heat for operations that are not adversely affected by the weather.
   1. The Contractor shall maintain a minimum temperature of 40 degrees F at the working surface, unless higher temperatures are required for specific work activities. This provision does not supersede any specific requirements for methods of construction, curing of materials, or the applicable General Conditions set forth in the Contract Documents with added regard to performance obligations of the Contractor.
   2. During the progress of the Work and at all times prior to the date of Substantial Completion, the Contractor shall provide temporary heat as required to prevent damage to completed work, work in progress or stored materials.
      a. For renovation of existing facilities, the Contractor may use existing heating systems to the extent that they are suitable for temporary heat and the Owner will continue to pay fuel costs related thereto, provided that such costs are not excessive or unreasonable.
      b. For new additions, the Contractor shall provide independent temporary heating systems and shall pay all costs, including fuel, related thereto.
   3. The Contractor may, where applicable and with the approval of the Architect, elect to use the permanent new heating system as specified for the project once it has been tested and is ready to operate. Should the permanent new system be used for temporary heat during construction, the Contractor shall pay for all maintenance and fuel related to such use. Upon Substantial Completion, filters shall be replaced and the system shall be cleaned and adjusted. Such cleaning shall include the insides of all ductwork used during construction and intended to remain in operation.
      a. The entire system shall be returned to suitable conditions in accordance with the HVAC protection measures described in Section 01 57 21 Indoor Air Quality Controls. The Contractor shall verify that his use of new systems during construction will not diminish applicable warranties.

F. Operating labor shall be provided by the Contractor for all heating equipment. Operating labor shall include frequent inspection, emergency repairs, and maintaining temperature records. The Contractor shall provide continuous direct attendance as appropriate or otherwise required by governing authorities.
   1. The installation and operation of heating devices used hereunder shall comply with all safety regulations, including provisions for adequate ventilation and fire protection. Select safe equipment that will not have a harmful effect on completed installation or elements being installed. Coordinate ventilation requirement to produce the ambient condition required and minimize consumption of energy. Use of gasoline burning space heaters, open flame, or salamander type heating units is prohibited. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes vapors, or gases.

G. Temporary Ventilation: Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

3.03 TEMPORARY SUPPORT FACILITIES INSTALLATION

A. Storage Sheds and Trailers: Existing facilities and/or new construction shall not be available for this purpose.
   1. All field offices, storage sheds, and trailers located within the construction area, or within 30 feet of building lines shall be of non-combustible construction, complying with requirements of NFPA 241.
   2. Construction shanties, sheds, and temporary facilities provided as required above or for the Contractor's convenience shall be located as approved by the Owner and governing authorities and maintained in good condition and neat appearance.

B. Temporary Roads and Parking: Construct and maintain temporary roads to adequately support loading and withstand exposure to traffic during the construction period. If possible, locate temporary roads, storage areas, and parking where the same permanent facilities will be located. Coordinate temporary road development with sub-grade grading, compaction, installation and stabilization of sub-base, and installation of base and finish coats of permanent paving. Extend temporary roads in and around the construction area as necessary to accommodate delivery and storage of material, equipment usage, administration, and supervision. Plan installation of the final course of permanent paving after all heavy truck traffic and immediately before Substantial Completion. Coordinate with weather conditions to avoid unsatisfactory results.

C. Temporary Traffic Control: Provide temporary traffic control at the junction of temporary roads with public roads, including, but not limited to, warning signs for public traffic and "STOP" signs for entrance onto public roads. Comply with requirements of local or state traffic authorities. Provide all necessary equipment, flag people, or special police, as required by traffic authorities having jurisdiction.

D. Temporary Stairs, Lifts, and Hoists: The Contractor shall furnish and maintain all equipment such as temporary stairs, ladders, ramps, scaffolds, runways, chutes, etc., as required for the proper execution of the Work, unless specifically included under the Work of other trades.
   1. All such apparatus, equipment, and construction shall meet all requirements of applicable laws, regulations, and standards of safety and good practice.
   2. Until permanent stairs are available, provide temporary stairs where ladders are not adequate. As soon as permanent stairs are erected, the Contractor shall provide temporary protective treads, and handrails.
   3. All hoisting equipment and machinery required for the proper and expeditious prosecution and progress of the Work shall be furnished, installed, operated, and maintained in safe condition by the Contractor for the use of all subcontractors' material and/or equipment delivered to the designated hoisting area. All costs for such equipment operating services shall be paid by the Contractor.
   4. In the event that a particular subcontractor has certain specific requirements which are peculiar to his needs, and which cannot be satisfied with the hoist provided by the

Contractor, the subcontractor shall provide, maintain, operate, and pay for hoisting equipment necessary for the proper execution and completion of his work.

3.04 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Temporary Fire Protection: Until fire protection needs are supplied by permanent facilities, the Contractor shall provide and maintain in good operating condition temporary fire protection facilities of the types needed to protect against reasonably predictable and controllable fire losses, and as recommended by representatives of the fire insurance company carrying insurance on the Work or by governing fire or building authorities. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations".
   1. Flammable products shall be properly stored in containers acceptable to fire officials.
   2. The area within the site limits shall be kept orderly and clean, and all combustible rubbish shall be promptly removed from the site.
   3. Fire extinguishers shall be located where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stair well.
   4. Maintain unobstructed access to fire extinguishers, temporary fire protection facilities, stairways, and other access routes for fighting fires.
   5. Smoking shall be strictly prohibited on the construction site.
   6. Provide supervision of welding operations, soldering operations, combustion type temporary heating units, and similar sources of fire ignition.

B. Barricades, Warning Signs and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed provide lighting, including flashing red or amber lights.

C. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted, or that other undesirable effects might result. Minimize the use of tools and equipment that product excessive noise and restrict their use to hours that will minimize complaints from persons near the site.

D. Temporary Enclosures: Provide temporary enclosure for protection of construction in progress and completed, from exposure, foul weather, other construction operations, and similar activities.
   1. All cavities of masonry construction and masonry construction containing uncured mortar shall be covered during rainy conditions and at the end of a day's work.
   2. Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilation and material drying or curing requirements to avoid dangerous conditions and effects. This protection shall provide adequate working areas during winter months, consistent with the approved construction schedule to permit the continuous progress of all work necessary to maintain an orderly and efficient sequence of construction operations.
   3. Install tarpaulins securely, with non-combustible wood framing and other materials. Close openings 25 sq. feet or less with plywood or similar materials.
   4. Close openings through floor or roof decks and horizontal surfaces with load-bearing temporary construction. Where temporary wood or plywood is used and exceeds 100 sq feet in area, use fire-retardant treated framing and plywood.

E. Protective Covering of the Work: The Contractor shall protect all finished surfaces, including the jambs and soffits of all openings used as passageways or through which materials are handled, against any possible damage resulting from the conduct of work by all trades.
   1. All finished surfaces, including factory-finished and job-finished items, shall be clean and not marred upon delivery of the building to the Owner. The Contractor shall, without extra

compensation, refinish all spaces where such surfaces prove to have been inadequately protected and are damaged.

2. Tight wood sheathing shall be laid under any materials that are stored on or moved over finished surfaces. Reinforced non-staining kraft building paper and plywood or planking shall be laid over all types of finished floor surfaces in traffic areas before moving any material over these finished areas. Wheelbarrows, if used over such areas, shall have rubber-tired wheels.
3. Roof surfaces shall not be subjected to unnecessary traffic nor shall they be used for storage of material. Wherever such activity must take place in order to carry out the Work of the Contract, adequate protection shall be provided.
4. Prohibit traffic on grass and landscaped areas.

F. Temporary Tree and Plant Protection: The Contractor shall provide temporary fencing adequate to properly protect existing trees to remain specifically identified on the Drawings during construction. Fencing shall be located at each tree's drip line in order to protect the tree's root structure as well as its trunk and branches. Damaged trees shall be replaced in-kind at the Contractor's expense.

G. Worker I.D. Badges: The Contractor shall provide worker I.D. badges for all personnel present on the site involved with the Project. A list shall be maintained in the field office, identifying workers with their assigned badge number. Badges shall be prominently displayed at all times when on-site.

3.05 TERMINATION AND REMOVAL

A. Remove temporary facilities when the need has ended, or when replaced by authorized use of permanent facilities.

B. Materials and facilities that constitute temporary facilities are the property of the Contractor.

C. Remove temporary roads that are not intended or acceptable for integration into permanent roads. Remove soil and fill that does not comply with requirements for fill in these areas. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials. Repair or replace street paving and curb at the temporary entrances, as required by the governing authority.

D. At Substantial Completion, clean and restore permanent facilities that have been used during construction, including but not limited to, replacing air filters, cleaning ductwork, and replacing lamps affected by substantial use.

END OF SECTION

SECTION 01 57 21
INDOOR AIR QUALITY CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Construction procedures to promote adequate indoor air quality after construction.

1.02 PROJECT GOALS

A. Dust and Airborne Particulates: Prevent deposition of dust and other particulates in HVAC ducts and equipment.
   1. Contractor shall bear the cost of cleaning required due to failure to protect ducts and equipment from construction dust.
   2. Establish condition of existing ducts and equipment prior to start of alterations.

B. Airborne Contaminants: Procedures and products have been specified to minimize indoor air pollutants.
   1. Furnish products meeting the specifications.
   2. Avoid construction practices that could result in contamination of installed products leading to indoor air pollution.

1.03 REFERENCE STANDARDS

A. ASHRAE Std 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size; 2012.

B. ASHRAE Std 62.1 - Ventilation For Acceptable Indoor Air Quality; 2013.

C. ASHRAE Std 129 - Measuring Air-Change Effectiveness; 1997 (Reaffirmed 2002).

1.04 DEFINITIONS

A. Adsorptive Materials: Gypsum board, acoustical ceiling tile and panels, carpet and carpet tile, fabrics, fibrous insulation, and other similar products.

B. Contaminants: Gases, vapors, regulated pollutants, airborne mold and mildew, and the like, as specified.

C. Particulates: Dust, dirt, and other airborne solid matter.

D. Wet Work: Concrete, plaster, coatings, and other products that emit water vapor or volatile organic compounds during installation, drying, or curing.

PART 2 PRODUCTS

2.01 MATERIALS

A. Low VOC Materials: See other sections for specific requirements for materials with low VOC content.

B. Auxiliary Air Filters: MERV of 8, minimum, when tested in accordance with ASHRAE 52.2.

PART 3 EXECUTION

3.01 CONSTRUCTION PROCEDURES

A. Prevent the absorption of moisture and humidity by adsorptive materials by:
   1. Sequencing the delivery of such materials so that they are not present in the building until wet work is completed and dry.
   2. Delivery and storage of such materials in fully sealed moisture-impermeable packaging.
   3. Provide sufficient ventilation for drying within reasonable time frame.

B. Begin construction ventilation when building is substantially enclosed.

C. If extremely dusty or dirty work must be conducted inside the building, shut down HVAC systems for the duration; remove dust and dirt completely before restarting systems.
   1. Air scrubbers will be required during extremely dusty or dirty work when such work is within or adjacent to existing or occupied areas.

D. When working in a portion of an occupied building, prevent movement of air from construction area to occupied area.

E. HVAC equipment and ductwork may NOT be used for ventilation during construction:
   1. Provide temporary ventilation equivalent to 1.5 air changes per hour, minimum.
   2. Exhaust directly to outside.
   3. HVAC ductwork shall be kept clean, free of dust during storage, handling and installation. Seal HVAC air inlets and outlets immediately after duct installation with tape and plastic sheeting. All seams in ductwork shall be sealed.

F. All inspection and filter replacement shall occur with the HVAC equipment turned off.

G. Do not store construction materials or waste in mechanical or electrical rooms.

H. Prior to use of return air ductwork without intake filters clean up and remove dust and debris generated by construction activities.
   1. Inspect duct intakes, return air grilles, and terminal units for dust.
   2. Clean plenum spaces, including top sides of lay-in ceilings, outsides of ducts, tops of pipes and conduit.
   3. Clean tops of doors and frames.
   4. Clean mechanical and electrical rooms, including tops of pipes, ducts, and conduit, equipment, and supports.
   5. Clean return plenums of air handling units.
   6. Remove intake filters last, after cleaning is complete.

I. Do not perform dusty or dirty work after starting use of return air ducts without intake filters.

J. Use other relevant recommendations of SMACNA 1072 for avoiding unnecessary contamination due to construction procedures.

END OF SECTION

SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.

B. Re-use of existing products.

C. Transportation, handling, storage and protection.

D. Product option requirements.

E. Substitution limitations and procedures.

F. Procedures for Owner-supplied products.

G. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 RELATED REQUIREMENTS

A. Document 00 21 13 - Instructions to Bidders: Product options and substitution procedures prior to bid date.

B. Section 01 00 00 - General Requirements.

C. Section 01 40 00 - Quality Requirements: Product quality monitoring.

1.03 SUBMITTALS

A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project. See Section 01 30 00 - Administrative Requirements, for more information regarding product data submittals.

B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances. See Section 01 30 00 - Administrative Requirements, for more information regarding Shop Drawings.

C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by the Contract Documents.

B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.

C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

2.02 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by the Contract Documents.

B. Do not use products made using or containing CFC's or HCFC's.

1. Made of wood from newly cut old growth timber.

C. Where all other criteria are met, Contractor shall give preference to products that:

1. Are extracted, harvested, and/or manufactured closer to the location of the project.
2. Have longer documented life span under normal use.
3. Result in less construction waste.

2.03 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers with product model: Use a product of one of the manufacturers named; no substitutions if so indicated; substitutions by following substitution procedures.

C. Products Specified by Naming One manufacturer with other acceptable manufacturers listed without product model: Submit a request for substitution following substitutions procedures.

2.04 MAINTENANCE MATERIALS

A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual Specification Sections.

B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES

A. Substitutions are changes, modifications or deviations in those products, materials, equipment, and methods of construction required by the Contract Documents proposed by the Contractor after the receipt of Bids. Substitutions for the convenience of the Contract or subcontractors, or materials suppliers will only be considered if submitted prior to the receipt of Bids, in strict conformance with the Instructions to Sub-bidders. The following shall not be considered substitutions:
   1. Changes, modifications, or deviations requested by Bidders during the bidding period and accepted prior to the receipt of Bids shall be considered as included in the Contact Documents and are not subject to the requirements of this Section.
   2. Revisions to Contract Documents requested by the Owner or Architect.
   3. Specified options of products or materials included in the Contract Documents.
   4. The Contractor's compliance with governing regulations and orders issued by governing authorities, subject to the Architect's prior written notice and approval.

B. Substitution Requests: Request for substitution will be considered only if, in the opinion of the Architect, such substitution will be of benefit to the Owner. Substitution requests after receipt of bids will not be considered solely related to an "or approved equal" clause in the Contract Documents.
   1. The Contractor's substitution request will be considered by the Architect when all of the following conditions are satisfied, as determined by the Architect; otherwise requests will be returned without action.
      a. Extensive revision to the Contract Documents is not required.
      b. Proposed changes are in keeping with the general intent of the Contract Documents.
      c. The request is timely, fully documented and properly submitted.
      d. In addition to the above conditions, one or more of the following conditions must be satisfied, as determined by the Architect. The Contractor shall provide written documentation for each condition noted.
         1) The specified product cannot be provided within the Contract Time. However, the request will not be considered if the specified product cannot be provided as a result of the Contractor's failure to submit to the Architect or order from the manufacturer in a timely fashion.
         2) The specified product cannot receive necessary approval of governing authority and the requested substitution can be approved.

3) A substantial advantage is offered to the Owner, in terms of cost savings, time savings, energy conservation, or other considerations of merit, after deducting offsetting responsibilities the Owner may be required to bear. Additional responsibilities for the Owner may include compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner or separate Contractors, and similar considerations.
4) The specified product cannot be provided in a manner that is compatible with or coordinated with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.
5) The specified product cannot provide the warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provides the required warranty.

C. Substitution Request Procedure: Complete the Contractor's Substitution Request form provided at the end of this Section. Submit electronically or three (3) hard copies of each request for substitution using the provided form with all required information. Incomplete forms will not be reviewed.

D. Architect's Action: Within five (5) working days of receipt, the Architect will request additional information to evaluate the substitution if any is required. Within ten (10) working days of receipt of all necessary information, the Architect will notify the Contractor of acceptance or rejection of the proposed substitute. If a decision on the use of a proposed substitute is not or cannot be made or obtained within the time allocated, the Contractor shall use the specified product. Acceptance will be in the form of a Change Order.

E. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this Section.

F. A request for substitution constitutes a representation that the submitter:
1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
2. Will provide the same or better warranty for the substitution as for the specified product.
3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
4. Waives claims for additional costs or time extension that may subsequently become apparent.

G. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

3.02 OWNER-SUPPLIED PRODUCTS

A. Owner's Responsibilities:
1. Arrange for and deliver shop drawings, product data, certificates, manufacturer's instructions and samples, to Owner.
2. Arrange and pay for product delivery to site in accordance with the progress schedule.
3. On delivery, inspect products jointly with Contractor.
4. Submit claims for transportation damage and arrange for replacement of damaged, defective, or deficient items.
5. Arrange for manufacturers' warranties, inspections, and service.

B. Contractor's Responsibilities:
1. Review Owner reviewed shop drawings, product data, and samples. Submit to the Architect with notification of any observed discrepancies or problems anticipated due to non-conformance with the Contract Documents.
2. Designating delivery dates for each product in accordance with the progress schedule.
3. Receive and unload products at site; inspect for completeness or damage jointly with Owner. Record shortages and damaged or defective items.
4. Install blocking and supports as required for proper installation.

5. Handle, uncrate, store, assemble, install, connect, adjust and finish products.
6. Protecting products from damage and from exposure to the elements.
7. After receipt, repair or replace items damaged the Contractor or persons under his control.

C. Owner furnished equipment for installation by the Contractor may be indicated on the Drawings, or otherwise identified for the Contractor's information. Concealed wood blocking shall be provided for mounting equipment. See Section 06 10 54.

3.03 TRANSPORTATION AND HANDLING

A. The Contractor shall be responsible for the proper protection from damage of all materials and equipment prior to and following their incorporation into the Work. Materials and equipment shall be inspected by the Contractor

B. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

C. Transport and handle products in accordance with manufacturer's instructions.

D. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

E. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, products are undamaged and if found to be damaged or otherwise unsuitable, shall be promptly rejected.

F. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

G. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

H. All materials stored on or off the site shall be kept in secured, weathertight enclosures, and the Contractor shall correct, at no additional cost to the Owner, any damages resulting from his failure to provide proper protection. Such corrective work shall include total replacement if so required by the Architect.

I. The Contractor shall exercise caution in temporarily loading materials on floors, decks, roofs, etc. It shall be the Contractor's responsibility to determine the size of loads to be imposed and the adequacy of the affected structure to support such loads. The Contractor shall correct, at no additional cost to the Owner, any resultant damages.

3.04 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.

G. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

H. Prevent contact with material that may cause corrosion, discoloration, or staining.

I. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

J. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

CONTRACTOR'S SUBSTITUTION REQUEST

To Architect: _____ Date: _____

From Contractor: _____ Number: _____

Specification Section: _____ Page: _____

Article / Paragraph: _____

1. Product data for proposed substitution to include: Description of product, reference standards, performance, and test data.

   Sample attached: Yes__ No __ To be sent if requested by Architect Yes ___ No ___

2. Itemized comparison of proposed substitution with product specified is attached.

	ORIGINAL PRODUCT	PROPOSED SUBSTITUTION
Trade Name, Model:	_____	_____
Manufacturer:	_____	_____
Installer:	_____	_____

   History of proposed substitution: New product ____ 2-5 years old ___ 5-10 years old___ > 10 years old ____

   Significant variations of proposed substitution from original product: _____

   _____

   Proposed substitution affects other parts of the Work: No __Yes __, explain _____

   _____

   Similar installations within 150 miles: Provide project name, address, architect, install date:

   _____

   Reason for not providing specified item: _____

3. Unit costs, if applicable: State if cost is materials only ___ or materials installed ___.

   Original product $ _____ per _____ Substitution $ _____ per _____

   Savings to Owner for accepting substitution: _____ $_____

   Proposed substitution changes Contract Time: No ___ Yes __ Add/Deduct _____ days.

   The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior to the specified product.
- Same warranty will be furnished for proposed substitution as for the specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated herein is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions, functional clearances or design appearance.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation and changes in the Work as necessary for accepted substitution will be complete in all respects.

   Submitted by: _____

   Attachments: _____

SECTION 01 71 00
CUTTING AND PATCHING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included in This Section:
   1. Provide all labor, materials, equipment and services, etc., required for all cutting (including excavation), removal, fitting, patching, and/or repairs as required to:
      a. Make the several parts fit properly.
      b. Uncover work to provide for installing, inspecting, or both, of ill-timed work.
      c. Remove and replace work not conforming to requirements of the Contract Documents.
      d. Remove and replace defective work.

B. Related Work:
   1. In addition to other requirements noted or specified, upon the Architect's request uncover work to provide for observation by the Architect of covered work, and remove samples of installed materials for testing.
   2. Do not cut or alter work performed under separate contracts without the Architect's written permission.

1.02 SUBMITTALS

A. Where cutting and/or patching is required, the Architect's review of proposed cutting and patching procedures is required. The following information shall be included in the submission prior to proceeding with cutting:
   1. Clearly describe the extent of cutting and patching required and how it is to be performed. Layout the work on-site as appropriate. Indicate why it cannot be avoided.
   2. Describe the anticipated results in terms of changes to existing construction. Include changes to structural elements and operating components and changes in the building's appearance and other visual elements.
   3. List products to be used and firms that will perform the Work. Indicate dates for cutting and patching. Submit samples of actual materials to be used for patching.
   4. List any utilities that will be disturbed, relocated, made temporarily out-of–service, and indicate the length of service disruption.
   5. Where cutting and patching involves the addition of reinforcement to structural elements, submit details and engineering calculations to show how reinforcement is integrated with the original structure.

B. Acceptance of the cutting and patching proposal by the Architect does not waive the Architect's right to later require complete removal and replacement of Work found to be unsatisfactory, nor does it alter the Contractor's sole responsibility for the safe and proper execution of all cutting and patching.

C. Submit written notice to the Architect designating the time the Work will be uncovered, to provide for the Architect's observation.

1.03 QUALITY ASSURANCE

A. Structural Work: Do not cut and patch structural elements in a manner that would reduce their structural characteristics such as load-carrying capacity or load deflection ratio.
   1. Obtain approval of the cutting and patching proposal before cutting and patching structural elements, including but not necessarily limited to:
      a. Foundation construction.
      b. Bearing and retaining walls.
      c. Structural concrete.
      d. Structural steel.
      e. Lintels.

f. Structural decking.
g. Stair systems.
h. Miscellaneous structural metals.
i. Equipment supports.
j. Piping, ductwork, vessels, and equipment.

B. Operational and Safety Limitations: Do not cut and patch operating elements or safety components in a manner that would reduce their capacity to perform as intended, or would increase maintenance, or decrease operational life or safety.
1. Obtain approval of the cutting and patching proposal before cutting and patching operating elements or safety related systems, including but not necessarily limited to:
a. Shoring, bracing, and sheeting.
b. Primary operational systems and equipment.
c. Firewalls and fire separation assemblies.
d. Fire-rated and non-fire-rated smoke barriers.
e. Water, moisture, or vapor retarders.
f. Membranes and flashings.
g. Fire protection systems.
h. Sprayed-on Fireproofing.
i. Noise and vibration control elements and systems.
j. Control systems.
k. Voice, video, and data systems.
l. Conveying systems.
m. Electrical wiring systems.

C. Miscellaneous: Do not cut and patch elements in a manner that would reduce their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
1. Obtain approval of the cutting and patching proposal before cutting and patching building elements, including but not necessarily limited to:
a. Water, moisture or vapor barriers.
b. Membranes and flashings.
c. Exterior curtainwall construction.
d. Noise and vibration control elements and systems.
2. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace work cut and patched in a visually unsatisfactory manner.

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

PART 2 - PRODUCTS

2.01 MATERIALS

A. For replacement of items removed, use materials identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible. Use materials whose performance will equal or surpass that of existing materials.

2.02 PAYMENT FOR COSTS

A. Perform cutting and patching needed to comply with the Contract Documents at no additional cost to the Owner.

B. All costs resulting from ill-timed or defective work, or work otherwise not conforming to the Contract Documents shall be borne by the Contractor.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

A. Inspection: Inspect existing conditions, including elements subject to movement or damage during cutting, excavating, patching, and backfilling.

B. After uncovering the work, inspect conditions affecting installation of new work.

C. Prior to proceeding, meet with all parties involved in cutting and patching including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

D. Discrepancies: If uncovered conditions are not as anticipated, immediately notify the Architect and secure needed directions. Do not proceed until unsatisfactory conditions are corrected.

3.02 PREPARATION PRIOR TO CUTTING

A. Provide required protection including, but not necessarily limited to, shoring, bracing, and support to maintain structural integrity of the Work.

B. Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Work that might be exposed during cutting and patching operations.

C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas. Take all precautions to avoid cutting existing pipe, conduit, or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

D. Provide proper dirt, dust, fume, vapor, and noise control.

E. Verify the conditions and requirements of all existing warranties that may be affected by cutting and patching (such as roofing warranties). It is the intent that all cutting and patching be performed in a manner that preserves all such warranties in full, without compromise.

3.03 PERFORMANCE

A. General: Cutting and patching shall be kept to an absolute minimum by careful planning and through proper holes, sleeves, anchors, inserts, or other built-ins as the Work progresses.

B. Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.

C. The Contractor shall properly restore work that has been cut or removed and install new products to provide completed work in accordance with the requirements of the Contract Documents. Existing surfaces shall be restored to their original condition.

D. Cutting: Perform cutting and demolition by methods least likely to damage elements to be retained or adjoining construction and that will provide proper surfaces to receive installation of repair and new work. Where possible, review procedures with the original installer. Comply with the original installer’s recommendations.

E. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

F. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.

G. Cut through concrete and masonry using a cutting machine such as a carborundum saw or diamond core drill.

H. Perform necessary excavating and backfilling as required under pertinent other Sections of these Specifications.

I. By-pass utility services such as pipe or conduit, before cutting, where services are shown, or removal required, relocated, or abandoned. Cut off pipe or conduit in walls or partitions, to be

removed. Cap, valve, or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.

J. Patching: Perform fitting and adjusting of products as required to provide finished installations complying with the specified tolerances and finishes or otherwise satisfactory to the Architect.

K. Patch with durable seams that are as invisible as possible. Comply with specified tolerances.

L. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

M. Where the removal of walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary to achieve uniform color and appearance.

N. Where patching occurs in a smooth painted surface, extend final paint coat over the entire unbroken surface containing the patch, after the patched area has received primer and first coat.

O. Patch, repair, or re-hang existing ceilings, as necessary to provide an even plane surface of uniform appearance.

P. At penetrations in fire-resistive rated walls, partitions, ceilings, floors, or roof construction, completely seal voids with firestopping materials in compliance with Section 07 84 00 - Firestopping.

3.04 CLEAN-UP

A. All debris and rubbish shall be properly removed from the premises as it occurs. All materials shall be properly disposed of off-site, in strict accordance with all applicable Laws, Rules, Regulations, and Ordinances.

B. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Completely remove paint, mortar, oils, putty, and similar items. Thoroughly clean surfaces before painting or finishing.

END OF SECTION

SECTION 01 74 19
CONSTRUCTION WASTE MANAGEMENT

PART 1 GENERAL

1.01 WASTE MANAGEMENT REQUIREMENTS

A. Owner requires that this project generate the least amount of trash and waste possible.

B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.

C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.

D. Required Recycling, Salvage, and Reuse: The following may not be disposed of in landfills or by incineration:
   1. Aluminum, glass and plastic beverage containers.
   2. Corrugated cardboard.
   3. Wood pallets.
   4. Clean dimensional wood.
   5. Land clearing debris, including brush, branches, logs, and stumps; see Section 31 10 00 - Site Clearing for use options.
   6. Asphalt paving.
   7. Metals, including packaging banding, metal studs, sheet metal, structural steel, piping, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
   8. Glass.
   9. Plastic buckets.
   10. Fluorescent lamps (light bulbs).
   11. Acoustical ceiling tile and panels.

E. Construction waste shall be sent to a certified recycling facility for sorting to recycle and reuse whenever possible. Any loads contaminated with municipal solid waste shall be taken to a municipal transfer station for off loading and trucking to a certified recycling facility. Materials that cannot be recycled or reused shall be landfilled. It is expected that at least 75% of loads shall be diverted from landfills.

F. Demolition debris shall be sent to a certified recycling facility for sorting to recycle, reuse and remainder to landfill. It is expected that at least 75% of loads shall be diverted from landfills.

G. Estimated Analysis of Construction Waste and Demolition Debris:
   1. Quantity of construction waste and Demolition shall be determined as the materials are removed from the job site. Certifications shall be provided by the construction waste / demolition waste removal contractor to confirm and document the quantities of recycled content and the quantity of landfill content.
   2. Detailed logs of all waste removal and recycling shall be provided by the certified recycling facilities on a monthly basis. The log shall include:
      a. Date, disposal ticket #, materials type, total weight of the load, weight of material recycled from the load, % of materials recycled, materials destinations, tipping fees and disposal cost.

H. Contractor shall submit periodic Waste Disposal Reports; all landfill disposal, recycling, salvage, and reuse must be reported regardless of to whom the cost or savings accrues; use the same units of measure on all reports.

I. Contractor shall develop and follow a Waste Management Plan designed to implement these requirements.

J. Methods of trash/waste disposal that are not acceptable are:
   1. Burning on the project site.

2. Burying on the project site.
3. Dumping or burying on other property, public or private.
4. Other illegal dumping or burying.
5. Incineration, either on-site or off-site.

K. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.02 DEFINITIONS

A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.

B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.

C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.

D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.

E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.

F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.

G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.

H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

I. Return: To give back reusable items or unused products to vendors for credit.

J. Reuse: To reuse a construction waste material in some manner on the project site.

K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.

L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.

M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.

N. Toxic: Poisonous to humans either immediately or after a long period of exposure.

O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.

P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Submit Waste Management Plan within 10 calendar days after receipt of Notice of Award of Bid, or prior to any trash or waste removal, whichever occurs sooner; submit projection of all trash and waste that will require disposal and alternatives to landfilling.

C. Waste Management Plan: Include the following information:
1. Analysis of the trash and waste projected to be generated during the entire project construction cycle, including types and quantities.
2. Landfill Options: The name, address, and telephone number of the landfill(s) where trash/waste will be disposed of, the applicable landfill tipping fee(s), and the projected cost of landfill disposal of all non-recycled project trash/waste.

3. Landfill Alternatives: List all waste materials that will be diverted from landfills by reuse, salvage, or recycling.
4. Meetings: Describe regular meetings to be held to address waste prevention, reduction, recycling, salvage, reuse, and disposal.
5. Designation of the party who will be responsible for implementing the plan.

D. Waste Disposal Reports: Submit monthly reports, with details of quantities of trash and waste, means of disposal or reuse, and costs; show both totals to date and since last report.
1. Submit updated Report with each Application for Progress Payment; failure to submit Report will delay payment.
2. Landfill Disposal: Include the following information:
   a. Identification of material.
   b. Amount, in tons or cubic yards, of trash/waste material from the project disposed of in landfills.
   c. State the identity of landfills, total amount of tipping fees paid to landfill, and total disposal cost.
   d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
3. Recycled and Salvaged Materials: Include the following information for each:
   a. Identification of material, including those retrieved by installer for use on other projects.
   b. Amount, in tons or cubic yards, date removed from the project site, and receiving party.
   c. Transportation cost, amount paid or received for the material, and the net total cost or savings of salvage or recycling each material.
   d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
   e. Certification by receiving party that materials will not be disposed of in landfills or by incineration.
4. Material Reused on Project: Include the following information for each:
   a. Identification of material and how it was used in the project.
   b. Amount, in tons or cubic yards.
   c. Include weight tickets as evidence of quantity.
5. Other Disposal Methods: Include information similar to that described above, as appropriate to disposal method.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Manager: Designate a person who will be responsible for implementing the plan, instructing workers, coordinating waste materials handling, any on-site separation requirements for all trades and overseeing and documenting results of the Waste Management Plan.

B. Communication: Distribute copies of the Waste Management Plan to job site superintendent, each subcontractor, Owner, and Architect.

C. Meetings: Discuss trash/waste management goals and issues at project meetings.
1. Pre-bid meeting.
2. Pre-construction meeting.
3. Regular job-site meetings.
4. Project Close-out meeting.

D. Facilities: Provide specific facilities for on-site containment and transportation of demolition debris and construction waste materials to off-site recycling and disposal facility for use by all contractors and installers
   1. Provide containers as required.
   2. Provide adequate space for pick-up and delivery of containers.
   3. Keep trash/waste bin areas neat and clean.

E. Do not handle, separate, store, salvage, or recycle hazardous materials. Contact Owner if hazardous materials are encountered.

END OF SECTION

SECTION 01 78 00
PROJECT CLOSE-OUT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Substantial Completion procedures.
   1. Project Close-out meeting.
   2. Occupancy Permit.

B. Project Record Documents.
   1. Record Drawings.
   2. List of Subcontractors and material suppliers.
   3. Operation and Maintenance Data.
   4. Warranties and bonds.
   5. Contractor's Certificate of No Hazardous Materials.
   6. Testing Agency Final Report.

C. Architect's evaluation of the Work.

D. Final Acceptance procedures.

E. Operating and Maintenance Instructional Sessions.

F. Adjustments.

G. Final Cleaning.

1.02 RELATED REQUIREMENTS

A. Section 00 72 00 - General Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.

B. Section 01 00 00 - General Requirements.

C. Section 01 00 30 - Electronic Media: Record Drawing backgrounds.

D. Section 01 30 00 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

E. Section 01 40 00 - Quality Services: Final Test Reports.

F. Section 01 78 10 - Warranties: General warranty requirements.

G. Individual Product Sections: Specific requirements for operation and maintenance data.

H. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBSTANTIAL COMPLETION PRELIMINARY PROCEDURES

A. Prior to requesting evaluation of the Work for certification of Substantial Completion, the Contractor shall complete the following items.

B. Close-out Meeting: Not less than thirty (30) days prior to the anticipated date of Substantial Completion, the Contractor shall conduct a Project close-out meeting. Participants in the meeting shall include the Contractor, subcontractors, Commissioning Agent, Owner and Architect. The Contractor shall prepare the agenda and schedule of close-out tasks, for prior distribution, which, among other items as may be determined by the Contractor, shall include the following:
   1. HVAC Start-up Activities.
   2. Programming of Energy Management System
   3. HVAC System Commissioning
      a. Electrical and Mechanical Systems Final Testing
   4. Indoor Air Quality Testing (as applicable)
   5. Testing and Inspections with Authorities Having Jurisdiction:
      a. Fire alarm system test

b. Generator and transfer switch test
c. Sprinkler system testing
d. Kitchen hood suppression system testing
e. Fire and smoke vents, fire shutters
f. Elevator and lift testing and inspection
g. Health Department food service inspections
h. Certificate of Occupancy inspection

6. Other Testing.
   a. Security system
   b. Data and Telephone distribution systems
7. Owner's Equipment Testing.
   a. Telephone equipment
   b. Computer network equipment
   c. Audio-visual equipment
8. Delivery of tools, spare parts, extra stock, etc.
9. Punch Lists:
   a. Contractor
   b. Architect / Owner
10. Final Cleaning Operations.
11. Transition Security Issues.
    a. Removal of construction trailers, fencing, gates, etc.
    b. Door key change-over
    c. Set-up key cabinet
    d. Miscellaneous key turn-over (casework, millwork, toilet accessories, gas valves, F.D. security key box, septic pump station, display cases, flag pole lock keys, etc.)
    e. Activation of the security system
12. Transition Issues.
    a. Insurance change-over.
    b. Owner's schedule for move-in of furnishings and equipment
13. Instructional Sessions:
    a. Mechanical, sprinkler and electrical systems.
    b. Irrigation system
    c. Carpet cleaning & maintenance
    d. Food service equipment
    e. Elevators and lifts
14. Record Information:
    a. Warranty binder
    b. Record Drawings
    c. Record survey
    d. O&M manuals
    e. Food service equipment binders
15. Close-out Paperwork:
    a. Release of Liens
    b. Consent of Surety
    c. Certification of No Hazardous Materials
    d. Testing Agency Final Report

C. Adjust Contract Amount by Change Order to assess Owner for additional cost or savings due to increase or decrease in:
   1. Savings accrued under the Guaranteed Maximum Price.

D. Contractor's Punch List: Prior to preparation of a punch list by the Owner and Architect, the Contractor shall prepare his own comprehensive punch list, and along with his subcontractors, properly complete all Work items thereon. The receipt of the Contractor's written punch list, clearly identifying all completed and pending items, shall be considered a prerequisite for the

commencement of the Owner and Architect's evaluation of the Work for Substantial Completion.

E. Advise Owner of pending insurance and utility change-over requirements.

F. Submit warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.

G. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities, including Occupancy Permits, operating certificates and similar releases. If the Project is completed in phases, obtain Occupancy Permits as required by governing authorities.

H. Deliver tools, spare parts, extra stock, and similar items.

I. Make final change-over for locks, keys, and other security provisions.

J. Complete start-up testing of equipment and systems, conduct Owner's training sessions.

K. Discontinue, change over and remove temporary facilities from the site. Remove temporary protection measures provided during construction.

L. Final Cleaning.

M. Certificate of Occupancy: The Contractor shall schedule various inspections with the Authority Having Jurisdiction as required to obtain a Certificate of Occupancy.

1.04 SUBMITTALS

A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.

1. Record Drawings: Shall be required for all Site Utilities, Site Drainage, Architecture, Building Structure, Mechanical Systems, Fire Protection Systems and Electrical Systems.
    a. The Contractor shall maintain one set of Contract Drawings for use in the preparation of Record Drawings. This set shall be maintained at the site, and upon them, the Contractor shall clearly and accurately record all Addenda, Supplementary Instructions, Change Orders, Architect's responses to Contractor's Requests for Information, and all significant changes made during construction to the Work hereinafter listed.
    b. Upon completion of the Contract, and as a prerequisite to final Payment, the Contractor shall prepare (draft as necessary), check, and certify the Record Drawings for completeness and accuracy and submit them to the Architect. The Contractor's submittal shall include one set of CD Rom electronic media files and one set blackline hard copy Record Drawings. The Contractor shall imprint the following text on each Record Drawing and Record Drawing Electronic Media File:
        1) NOTE: This drawing has been produced by (name and address of contractor). It is not the originally designed Contract Document. It is a Record Drawing."
        2) See Section 01 00 30 - Electronic Media for information regarding obtaining electronic Contract Documents for use in preparing for Record Drawings.
    c. The Architect will casually review such drawings, but will in no way ascertain or certify their completeness or correctness, which shall remain the sole responsibility of the Contractor. The Architect shall be entitled to rely upon the thoroughness and accuracy of the Contractor's documents, without further verification. Following his review, the Architect will forward all Record Drawings to the Owner for his use.
2. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Complete miscellaneous records, place in good order, properly identified and bound ready for reference and submit to the Architect for the Owner's records.
3. List of Subcontractors: The Contractor shall submit to the Architect two (2) typed updated lists of all subcontractors, service organizations, and principal vendors, including names, addresses, and telephone numbers where they can be reached for emergency service at all times including nights, weekends, and holidays.

B. Operation and Maintenance Data:
   1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
   2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
   3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
   4. Submit two sets of revised final documents in final form within 10 days after final inspection.

C. Warranties and Bonds:
   1. The Contactor shall submit to the Architect two (2) typed sets, neatly bound and indexed in a loose leaf binder, of all warranties, certificates and bonds as required by the Contract Documents.
   2. For equipment or component parts of equipment put into service during construction with Owner's permission, submit a copy of documents within 10 days after acceptance.
   3. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
   4. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period. Pages shall be pre-punched for insertion into the bound set.

1.05 ARCHITECT'S EVALUATION

A. On receipt of a written request from the Contractor, the Architect will either proceed with evaluation of the Work for Substantial Completion or advise the Contractor of requirements yet to be completed prior to evaluation.

B. Based on his/her observations, the Architect will provide a written list, or "Punch List", of items to be corrected or to be completed. The Architect's list may not include all Work necessary for completion in accordance with the Contract Documents and shall not in any way relieve the Contractor of responsibility for compliance with the Contract Documents.

C. The Architect shall prepare the AIA G704 Certificate of Substantial Completion form and attach his/her written evaluation list thereto.

D. Additional Work found to be incomplete or not in conformance with the Contract Documents after the Architect's evaluation shall be completed or corrected before Final Acceptance and Final Payment.

E. When Work has been completed or corrected, the Contractor shall submit to the Architect a written request for re-evaluation. Include a copy of the Architect's previous evaluation report with notation of action taken for each item.

1.06 FINAL ACCEPTANCE

A. Within five (5) working days after the date of Substantial Completion, the Contractor shall provide a list of final Contract requirements with anticipated completion dates including:
   1. List of incomplete Work.
   2. Final Change Orders.
   3. Consent of Surety to final payment
   4. Assurances that unsettled claims will be settled.
   5. Record Drawings, O& M Manuals, Final Project Photos, Damage or Settlement Survey or other final record information.
   6. Final Application for Payment with releases and supporting documentation, including final waivers of lien.
   7. Written confirmation that corrective work related to any failed quality control testing has been provided, and that satisfactory retesting has been performed and approved by the testing agency.

B. Re-evaluation Procedure: The Architect will re-evaluate the Work upon receipt of written notice from the Contractor that the Work, including correction of items previously noted, has been completed.
   1. Upon completion of re-evaluation, the Architect will prepare a Certificate of Final Acceptance, or advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for Final Acceptance.
   2. If necessary, re-evaluation for Final Acceptance will be repeated. Cost of re-evaluation will be the responsibility of the Contractor.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 INDOOR AIR QUALITY MANAGEMENT

A. The Contractor and his various subcontractors as he may direct shall implement the procedures throughout construction in an effort to improve indoor air quality during the Owner's occupancy. See 01 57 21 - Indoor Air Quality Controls.

3.02 BUILDING COMMISSIONING

A. Mechanical and Electrical Systems Final Testing: The Contractor shall submit final performance acceptance reports prepared by licensed professional mechanical and electrical engineers as required. See Section 01 40 00 - Quality Services.

3.03 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Changes made by Addenda and modifications.

F. Record Drawings: Legibly mark each item to record actual construction including:
   1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   2. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   3. Field changes of dimension and detail.
   4. Details not on original Contract drawings.

3.04 OPERATION AND MAINTENANCE DATA

A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.05 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:
   1. Product data, with catalog number, size, composition, and color and texture designations.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

C. Additional information as specified in individual product specification sections.

D. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.06 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System:
   1. Description of unit or system, and component parts.
   2. Identify function, normal operating characteristics, and limiting conditions.
   3. Include performance curves, with engineering data and tests.
   4. Complete nomenclature and model number of replaceable parts.

B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

D. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

E. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

F. Provide servicing and lubrication schedule, and list of lubricants required.

G. Include manufacturer's printed operation and maintenance instructions.

H. Include sequence of operation by controls manufacturer.

I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

J. Provide control diagrams by controls manufacturer as installed.

K. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

L. Include test and balancing reports.

M. Additional Requirements: As specified in individual product specification sections.

3.07 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.

B. Where systems involve more than one specification section, provide separate tabbed divider for each system.

C. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

D. Prepare data in the form of an instructional manual.

E. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

F. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

G. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.

H. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.

I. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.

J. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.

K. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages, house in plastic sleeves.

L. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.

M. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
   1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.
   2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
      a. Significant design criteria.
      b. List of equipment.
      c. Parts list for each component.
      d. Operating instructions.
      e. Maintenance instructions for equipment and systems.
      f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
   3. Part 3: Project documents and certificates, including the following:
      a. Shop drawings and product data.
      b. Air and water balance reports.
      c. Certificates.

3.08 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Provide spare parts, maintenance, and extra products in quantities as specified in individual Specification Sections. Deliver to the site and place in locations as directed by the Owner. Obtain receipts signed by Owner's Representative and submit copies to the Architect if so directed.

3.09 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.

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

C. Co-execute submittals when required.

D. See Section 01 78 10: Warranties, for additional information.

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

F. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.

G. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.

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

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

3.10 CERTIFICATE OF NO ASBESTOS

A. See Section 01 30 00 - Administrative Requirements, for requirements for submission of Certificate(s) of No Asbestos.

3.11 FINAL TESTING REPORTS

A. See Section 01 40 00 - Quality Services, for requirements for the Testing Agency's Final Report.

3.12 OPERATING AND MAINTENANCE INSTRUCTIONS / OWNER TRAINING

A. Instructions: The Contractor and his subcontractors and suppliers shall jointly, thoroughly instruct the Owner's representative and maintenance personnel in the proper maintenance and operation of all materials and systems that require training for proper operation and/or regular maintenance as follows:
   1. Demonstrated and written detailed instructions shall be provided and reviewed for materials and systems listed in Substantial Completion Preliminary Procedures paragraph of this Section, shall include, but not be limited to:
      a. Start-up and Shut-down procedures.
      b. Emergency operations.
      c. Noise and vibration adjustments.
      d. Control sequences.
      e. Trouble-shooting.
      f. Safety procedures.
      g. Maintenance manuals.
      h. Maintenance agreements.
      i. Warranties.
      j. Record Drawings.
      k. Tools, spare parts, lubricants.
      l. Cleaning, economy and efficiency adjustments.
      m. Fuels, and fuel conversion, if applicable.
      n. Identification systems.
      o. Hazards. Any operations that, if improperly performed, might endanger the building's occupants or damage the building's equipment or contents.
   2. Video all demonstrations of operation and maintenance sessions, which shall be held at the completed facility to instruct the Owner in the proper operation of equipment and systems. Prior to final payment, deliver two (2) copies to the Architect for forwarding to the Owner.
   3. The Contractor shall obtain sign-off from the Owner for meeting with each installer or manufacturer's representative.
   4. For equipment or systems requiring seasonal operation perform demonstrations for the other season within six (6) months.

3.13 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation. For testing, adjusting and balancing of HVAC systems see Division 25 - Mechanical.

3.14 FINAL CLEANING

A. Final Cleaning: Upon the completion of the Work, the Contractor shall remove all tools, scaffolding, surplus materials, debris, and shall leave the Work "broom clean" or its equivalent. In addition to general broom cleaning, the Contractor shall employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Use products that are non-hazardous. Cleaning shall be in compliance with requirements of Section 01 73 40 - Indoor Air Quality and with all manufacturer's written instructions. The following cleaning shall be done just before inspection for certification of Substantial Completion and final acceptance of the Work:
   1. Transparent Materials: Clean mirrors and glazing in doors and windows; remove paint and glazing compounds that are noticeably vision obscuring; wash and polish, taking care not to scratch materials. Replace chipped, scratched, or broken materials.
   2. Ceiling and Wall Surfaces: Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, marks, fingerprints, films and similar foreign substances. Restore reflective surfaces to their original reflective condition. Carefully clean (vacuum) fabric type surfaces as recommended by manufacturer. Generally clean as required to leave in first class condition.
   3. Flooring: Remove all temporary protection; remove all spots, soil and paint; and clean, shampoo, wax, and buff, etc. all ceramic tile, resilient flooring, base, and other floors in accordance with manufacturer's recommendations. Leave concrete floors broom clean. Vacuum carpeted surfaces.
   4. Hardware: Clean and polish all hardware for all trades; this shall include removal of all paint stains, dust, dirt, etc.
   5. All fixtures, equipment, doors, and door and window frames: Clean all surfaces per manufacturer's instructions, removing all stains, paint, dirt and dust.
   6. Labels: Remove all labels that are not permanent.
   7. Mechanical and Electrical Equipment: Wipe surfaces of equipment to be free of paint, dirt, and dust. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps. Replace burned-out lamps.
   8. Roofs: Clean debris from roofs, scuppers, and drainage systems.
   9. Site: Clean the building site and surrounding ground. All trash and rubbish shall be removed and properly disposed of off-site and in accordance with Section 01 74 19 Construction Waste Management. Sweep paved areas broom clean and remove stains and spills. Rake disturbed grounds that are neither paved nor planted, to a smooth even-textured surface.

END OF SECTION

SECTION 01 78 10
WARRANTIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Administrative and procedural requirements for warranties.

1.02 RELATED SECTIONS

A. Section 01 00 00 - General Requirements.

B. Section 01 78 00 - Project Close-out.

C. Divisions 2 through 28 for specific Section requirements.

1.03 GENERAL

A. Manufacturers' disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

B. "Standard Product Warranties" are preprinted written warranties published by individual manufacturers of particular products and are specifically endorsed by the manufacturer to the Owner.

C. "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.

1.04 WARRANTY REQUIREMENTS

A. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.

B. Reinstatement of Warranty: When Work covered by a warranty has failed and has been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.

D. Owner's Recourse: Written 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, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.

1. The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.

E. Owner's Right of Refusal: The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

F. Commencement Date of Warranties: The Date of Substantial Completion designates the commencement date for warranties unless specifically indicated otherwise.

1. Commencement of warranties for items not accepted shall not begin until after items have been accepted.

2. In the event that portions of a system are made operational, are in service for the benefit of the Owner for projects with phased occupancy, the entire system shall remain under warranty until the entire system is completed, operational and accepted.
   a. At that time, a one (1) year total system warranty period shall begin.

1.05 SUBMITTALS

A. Submit written warranties and bonds to the Architect in conformance with Section 01 78 00 - Project Close-out.

B. When a special warranty is required from the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Architect for review by the Owner prior to final execution.

C. Form of Submittal: At Final Completion, compile two copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer.
   1. Verify the documents are in proper form, contain full information, and are notarized. Co-execute warranties when required.

1.06 SCHEDULE OF GUARANTEES, WARRANTIES, AND BONDS

A. Guarantee: The Contractor shall guarantee the entire Work to be free from defective or improper work or materials, and shall make good any damage due to such work or materials for a term of one year from the date of the satisfactory completion and acceptance of the Work. In general the commencement date for warranties and guarantees shall be the date of Substantial Completion. Under no circumstances shall any warranties or guarantees for any individual or collective materials or items of equipment commence prior to the date of Substantial Completion. Extended guarantees or warranties shall be provided as specified elsewhere.

B. Provide guarantees, warranties, and bonds on products and installations as specified in individual Sections.

END OF SECTION

SECTION 01 91 13
GENERAL COMMISSIONING REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Commissioning is intended to achieve the following specific objectives; this section specifies the Contractor's responsibilities for commissioning:
   1. Verify that the work is installed in accordance with the Contract Documents and the manufacturer's recommendations and instructions, and that it receives adequate operational checkout prior to startup: Startup reports and Prefunctional Checklists executed by Contractor are utilized to achieve this.
   2. Verify and document that functional performance is in accordance with the Contract Documents: Functional Tests executed by Contractor and witnessed by the Commissioning Authority are utilized to achieve this.
   3. Verify that operation and maintenance manuals submitted to Owner are complete: Detailed operation and maintenance (O&M) data submittals by Contractor are utilized to achieve this.
   4. Verify that the Owner's operating personnel are adequately trained: Formal training conducted by Contractor is utilized to achieve this.

B. Commissioning, including Functional Tests, O&M documentation review, and training, is to occur after startup and initial checkout and be completed before Substantial Completion

C. The Commissioning Authority directs and coordinates all commissioning activities; this section describes some but not all of the Commissioning Authority's responsibilities.

D. The Commissioning Authority is employed by Owner.

1.02 SCOPE OF COMMISSIONING

A. The following are to be commissioned:

B. Plumbing Systems:
   1. Water heaters.
   2. Booster pumps.

C. HVAC System, including:
   1. Major and minor equipment items.
   2. Piping systems and equipment.
   3. Ductwork and accessories.
   4. Terminal units.
   5. Control system.
   6. Variable frequency drives.

D. Electrical Systems:
   1. Power quality.
   2. Emergency power systems.

E. Other equipment and systems explicitly identified elsewhere in Contract Documents as requiring commissioning.

1.03 RELATED REQUIREMENTS

A. Section 01 78 00 - Closeout Submittals: Scope and procedures for operation and maintenance manuals and project record documents.

B. Section 23 08 00 - Commissioning of HVAC: HVAC control system testing; other requirements.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures; except:

1. Make all submittals specified in this section, and elsewhere where indicated for commissioning purposes, directly to the Commissioning Authority, unless they require review by Architect; in that case, submit to Architect first.
2. Submit one copy to the Commissioning Authority, not to be returned.
3. Make commissioning submittals on time schedule specified by Commissioning Authority.
4. Submittals indicated as "Draft" are intended for the use of the Commissioning Authority in preparation of Prefunctional Checklists or Functional Test requirements; submit in editable electronic format, Microsoft Word 2010 preferred.
5. As soon as possible after submittals made to Architect are approved, submit copy of approved submittal to the Commissioning Authority.

B. Manufacturers' Instructions: Submit copies of all manufacturer-provided instructions that are shipped with the equipment as soon as the equipment is delivered.

C. Product Data: If submittals to Architect do not include the following, submit copies as soon as possible:
1. Manufacturer's product data, cut sheets, and shop drawings.
2. Manufacturer's installation instructions.
3. Startup, operating, and troubleshooting procedures.
4. Fan and pump curves.
5. Factory test reports.
6. Warranty information, including details of Owner's responsibilities in regard to keeping warranties in force.

D. Startup Plans and Reports.

E. Completed Prefunctional Checklists.

PART 2 PRODUCTS

2.01 TEST EQUIPMENT

A. Provide all standard testing equipment required to perform startup and initial checkout and required Functional Testing; unless otherwise noted such testing equipment will NOT become the property of Owner.

B. Calibration Tolerances: Provide testing equipment of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified. If not otherwise noted, the following minimum requirements apply:
1. Temperature Sensors and Digital Thermometers: Certified calibration within past year to accuracy of 0.5 degree F and resolution of plus/minus 0.1 degree F.
2. Pressure Sensors: Accuracy of plus/minus 2.0 percent of the value range being measured (not full range of meter), calibrated within the last year.
3. Calibration: According to the manufacturer’s recommended intervals and when dropped or damaged; affix calibration tags or keep certificates readily available for inspection.

C. Equipment-Specific Tools: Where special testing equipment, tools and instruments are specific to a piece of equipment, are only available from the vendor, and are required in order to accomplish startup or Functional Testing, provide such equipment, tools, and instruments as part of the work at no extra cost to Owner; such equipment, tools, and instruments are to become the property of Owner.

D. Dataloggers: Independent equipment and software for monitoring flows, currents, status, pressures, etc. of equipment.
1. Dataloggers required to for Functional Tests will be provided by the Commissioning Authority and will not become the property of Owner.

PART 3 EXECUTION

3.01 COMMISSIONING PLAN

A. Commissioning Authority will prepare the Commissioning Plan.
   1. Attend meetings called by the Commissioning Authority for purposes of completing the commissioning plan.
   2. Require attendance and participation of relevant subcontractors, installers, suppliers, and manufacturer representatives.

B. Contractor is responsible for compliance with the Commissioning Plan.

C. Commissioning Plan: The commissioning schedule, procedures, and coordination requirements for all parties in the commissioning process.

D. Commissioning Schedule:
   1. Submit anticipated dates of startup of each item of equipment and system to Commissioning Authority within 60 days after award of Contract.
   2. Re-submit anticipated startup dates monthly, but not less than 4 weeks prior to startup.
   3. Prefunctional Checklists and Functional Tests are to be performed in sequence from components, to subsystems, to systems.
   4. Provide sufficient notice to Commissioning Authority for delivery of relevant Checklists and Functional Test procedures, to avoid delay.

3.02 STARTUP PLANS AND REPORTS

A. Startup Plans: For each item of equipment and system for which the manufacturer provides a startup plan, submit the plan not less than 8 weeks prior to startup.

B. Startup Reports: For each item of equipment and system for which the manufacturer provides a startup checklist (or startup plan or field checkout sheet), document compliance by submitting the completed startup checklist prior to startup, signed and dated by responsible entity.

C. Submit directly to the Commissioning Authority.

3.03 PREFUNCTIONAL CHECKLISTS

A. A Prefunctional Checklist is required to be filled out for each item of equipment or other assembly specified to be commissioned.
   1. No sampling of identical or near-identical items is allowed.
   2. These checklists do not replace manufacturers' recommended startup checklists, regardless of apparent redundancy.
   3. Prefunctional Checklist forms will not be complete until after award of the contract; the following types of information will be gathered via the completed Checklist forms:
      a. Certification by installing contractor that the unit is properly installed, started up, and operating and ready for Functional Testing.
      b. Confirmation of receipt of each shop drawing and commissioning submittal specified, itemized by unit.
      c. Manufacturer, model number, and relevant capacity information; list information "as specified," "as submitted," and "as installed."
      d. Serial number of installed unit.
      e. List of inspections to be conducted to document proper installation prior to startup and Functional Testing; these will be primarily static inspections and procedures; for equipment and systems may include normal manufacturer’s start-up checklist items and minor testing.
      f. Sensor and actuator calibration information.

B. Contractor is responsible for filling out Prefunctional Checklists, after completion of installation and before startup; witnessing by the Commissioning Authority is not required unless otherwise specified.

1. Each line item without deficiency is to be witnessed, initialed, and dated by the actual witness; checklists are not complete until all line items are initialed and dated complete without deficiencies.
2. Checklists with incomplete items may be submitted for approval provided the Contractor attests that incomplete items do not preclude the performance of safe and reliable Functional Testing; re-submission of the Checklist is required upon completion of remaining items.
3. Individual Checklists may contain line items that are the responsibility of more than one installer; Contractor shall assign responsibility to appropriate installers or subcontractors, with identification recorded on the form.
4. If any Checklist line item is not relevant, record reasons on the form.
5. Contractor may independently perform startup inspections and/or tests, at his option.
6. Regardless of these reporting requirements, Contractor is responsible for correct startup and operation.
7. Submit completed Checklists to Commissioning Authority within two days of completion.

C. Commissioning Authority is responsible for furnishing the Prefunctional Checklists to Contractor.
1. Initial Drafts: Contractor is responsible for initial draft of Prefunctional Checklist where so indicated in the Contract Documents.
2. Provide all additional information requested by Commissioning Authority to aid in preparation of checklists, such as shop drawing submittals, manufacturers' startup checklists, and O&M data.
3. Commissioning Authority may add any relevant items deemed necessary regardless of whether they are explicitly mentioned in the Contract Documents or not.
4. When asked to review the proposed Checklists, do so in a timely manner.

D. Commissioning Authority Witnessing: Required for:
1. Each piece of primary equipment, unless sampling of multiple similar units is allowed by the commissioning plan.
2. A sampling of non-primary equipment, as allowed by the commissioning plan.

E. Deficiencies: Correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to Owner.
1. If difficulty in correction would delay progress, report deficiency to the Commissioning Authority immediately.

3.04 FUNCTIONAL TESTS

A. A Functional Test is required for each item of equipment, system, or other assembly specified to be commissioned, unless sampling of multiple identical or near-identical units is allowed by the final test procedures.

B. Contractor is responsible for execution of required Functional Tests, after completion of Prefunctional Checklist and before closeout.

C. Commissioning Authority is responsible for witnessing and reporting results of Functional Tests, including preparation and completion of forms for that purpose.

D. Contractor is responsible for correction of deficiencies and re-testing at no extra cost to Owner; if a deficiency is not corrected and re-tested immediately, the Commissioning Authority will document the deficiency and the Contractor's stated intentions regarding correction.
1. Deficiencies are any condition in the installation or function of a component, piece of equipment or system that is not in compliance with the Contract Documents or does not perform properly.
2. When the deficiency has been corrected, the Contractor completes the form certifying that the item is ready to be re-tested and returns the form to the Commissioning Authority; the Commissioning Authority will reschedule the test and the Contractor shall re-test.
3. Identical or Near-Identical Items: If 10 percent, or three, whichever is greater, of identical or near-identical items fail to perform due to material or manufacturing defect, all items will

be considered defective; provide a proposal for correction within 2 weeks after notification of defect, including provision for testing sample installations prior to replacement of all items.

4. Contractor shall bear the cost of Owner and Commissioning Authority personnel time witnessing re-testing.
5. Contractor shall bear the cost of Owner and Commissioning Authority personnel time witnessing re-testing if the test failed due to failure to execute the relevant Prefunctional Checklist correctly; if the test failed for reasons that would not have been identified in the Prefunctional Checklist process, Contractor shall bear the cost of the second and subsequent re-tests.

E. Functional Test Procedures:
1. Some test procedures are included in the Contract Documents; where Functional Test procedures are not included in the Contract Documents, test procedures will be determined by the Commissioning Authority with input by and coordination with Contractor.
2. Examples of Functional Testing:
a. Test the dynamic function and operation of equipment and systems (rather than just components) using manual (direct observation) or monitoring methods under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint).
b. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc.
c. Systems are run through all the HVAC control system’s sequences of operation and components are verified to be responding as the sequence's state.
d. Traditional air or water test and balancing (TAB) is not Functional Testing; spot checking of TAB by demonstration to the Commissioning Authority is Functional Testing.

F. Deferred Functional Tests: Some tests may need to be performed later, after substantial completion, due to partial occupancy, equipment, seasonal requirements, design or other site conditions; performance of these tests remains the Contractor's responsibility regardless of timing.

3.05 SENSOR AND ACTUATOR CALIBRATION

A. Calibrate all field-installed temperature, relative humidity, carbon monoxide, carbon dioxide, and pressure sensors and gages, and all actuators (dampers and valves) on this piece of equipment shall be calibrated. Sensors installed in the unit at the factory with calibration certification provided need not be field calibrated.

B. Calibrate using the methods described below; alternate methods may be used, if approved by Owner beforehand. See PART 2 for test instrument requirements. Record methods used on the relevant Prefunctional Checklist or other suitable forms, documenting initial, intermediate and final results.

C. All Sensors:
1. Verify that sensor location is appropriate and away from potential causes of erratic operation.
2. Verify that sensors with shielded cable are grounded only at one end.
3. For sensor pairs that are used to determine a temperature or pressure difference, for temperature make sure they are reading within 0.2 degree F of each other, and for pressure, within tolerance equal to 2 percent of the reading, of each other.
4. Tolerances for critical applications may be tighter.

D. Sensors Without Transmitters - Standard Application:
1. Make a reading with a calibrated test instrument within 6 inches of the site sensor.
2. Verify that the sensor reading, via the permanent thermostat, gage or building automation system, is within the tolerances in the table below of the instrument-measured value.

3. If not, install offset, calibrate or replace sensor.

E. Sensors With Transmitters - Standard Application.
1. Disconnect sensor.
2. Connect a signal generator in place of sensor.
3. Connect ammeter in series between transmitter and building automation system control panel.
4. Using manufacturer's resistance-temperature data, simulate minimum desired temperature.
5. Adjust transmitter potentiometer zero until 4 mA is read by the ammeter.
6. Repeat for the maximum temperature matching 20 mA to the potentiometer span or maximum and verify at the building automation system.
7. Record all values and recalibrate controller as necessary to conform with specified control ramps, reset schedules, proportional relationship, reset relationship and P/I reaction.
8. Reconnect sensor.
9. Make a reading with a calibrated test instrument within 6 inches of the site sensor.
10. Verify that the sensor reading, via the permanent thermostat, gage or building automation system, is within the tolerances in the table below of the instrument-measured value.
11. If not, replace sensor and repeat.
12. For pressure sensors, perform a similar process with a suitable signal generator.

F. Sensor Tolerances for Standard Applications: Plus/minus the following maximums:
1. Watthour, Voltage, Amperage: 1 percent of design.
2. Pressure, Air, Water, Gas: 3 percent of design.
3. Air Temperatures (Outside Air, Space Air, Duct Air): 0.4 degrees F.
4. Relative Humidity: 4 percent of design.
5. Barometric Pressure: 0.1 inch of Hg.
6. Flow Rate, Air: 10 percent of design.
7. Flow Rate, Water: 4 percent of design.
8. AHU Wet Bulb and Dew Point: 2.0 degrees F.
9. Hot Water Coil and Boiler Water Temperature: 1.5 degrees F.
10. Cooling Coil, Chilled and Condenser Water Temperatures: 0.4 degrees F.
11. Combustion Flue Temperature: 5.0 degrees F.

G. Critical Applications: For some applications more rigorous calibration techniques may be required for selected sensors. Describe any such methods used on an attached sheet.

H. Valve/Damper Stroke Setup and Check:
1. For all valve/damper actuator positions checked, verify the actual position against the control system readout.
2. Set pump/fan to normal operating mode.
3. Command valve/damper closed; visually verify that valve/damper is closed and adjust output zero signal as required.
4. Command valve/damper to open; verify position is full open and adjust output signal as required.
5. Command valve/damper to a few intermediate positions.
6. If actual valve/damper position does not reasonably correspond, replace actuator or add pilot positioner (for pneumatics).

I. Isolation Valve or System Valve Leak Check: For valves not associated with coils.
1. With full pressure in the system, command valve closed.
2. Use an ultra-sonic flow meter to detect flow or leakage.

3.06 TEST PROCEDURES - GENERAL

A. Provide skilled technicians to execute starting of equipment and to execute the Functional Tests. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, adjustments and problem-solving.

B. Provide all necessary materials and system modifications required to produce the flows, pressures, temperatures, and conditions necessary to execute the test according to the specified conditions. At completion of the test, return all affected equipment and systems to their pre-test condition.

C. Sampling: Where Functional Testing of fewer than the total number of multiple identical or near-identical items is explicitly permitted, perform sampling as follows:
   1. Identical Units: Defined as units with same application and sequence of operation; only minor size or capacity difference.
   2. Sampling is not allowed for:
      a. Major equipment.
      b. Life-safety-critical equipment.
      c. Prefunctional Checklist execution.
   3. XX = the percent of the group of identical equipment to be included in each sample; defined for specific type of equipment.
   4. YY = the percent of the sample that if failed will require another sample to be tested; defined for specific type of equipment.
   5. Randomly test at least XX percent of each group of identical equipment, but not less than three units. This constitutes the "first sample."
   6. If YY percent of the units in the first sample fail, test another XX percent of the remaining identical units.
   7. If YY percent of the units in the second sample fail, test all remaining identical units.
   8. If frequent failures occur, resulting in more troubleshooting than testing, the Commissioning Authority may stop the testing and require Contractor to perform and document a checkout of the remaining units prior to continuing testing.

D. Manual Testing: Use hand-held instruments, immediate control system readouts, or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make the “observation”).

E. Simulating Conditions: Artificially create the necessary condition for the purpose of testing the response of a system; for example apply hot air to a space sensor using a hair dryer to see the response in a VAV box.

F. Simulating Signals: Disconnect the sensor and use a signal generator to send an amperage, resistance or pressure to the transducer and control system to simulate the sensor value.

G. Over-Writing Values: Change the sensor value known to the control system in the control system to see the response of the system; for example, change the outside air temperature value from 50 degrees F to 75 degrees F to verify economizer operation.

H. Indirect Indicators: Remote indicators of a response or condition, such as a reading from a control system screen reporting a damper to be 100 percent closed, are considered indirect indicators.

I. Monitoring: Record parameters (flow, current, status, pressure, etc.) of equipment operation using dataloggers or the trending capabilities of the relevant control systems; where monitoring of specific points is called for in Functional Test Procedures:
   1. All points that are monitored by the relevant control system shall be trended by Contractor; at the Commissioning Authority’s request, Contractor shall trend up to 20 percent more points than specified at no extra charge.
   2. Other points will be monitored by the Commissioning Authority using dataloggers.
   3. At the option of the Commissioning Authority, some control system monitoring may be replaced with datalogger monitoring.
   4. Provide hard copies of monitored data in columnar format with time down left column and at least 5 columns of point values on same page.
   5. Graphical output is desirable and is required for all output if the system can produce it.
   6. Monitoring may be used to augment manual testing.

3.07 OPERATION AND MAINTENANCE MANUALS

A. See Section 01 78 00 for additional requirements.

B. Add design intent documentation furnished by Architect to manuals prior to submission to Owner.

C. Submit manuals related to items that were commissioned to Commissioning Authority for review; make changes recommended by Commissioning Authority.

D. Commissioning Authority will add commissioning records to manuals after submission to Owner.

END OF SECTION

SECTION 01 91 14

COMMISSIONING AUTHORITY RESPONSIBILITIES

PART 1 GENERAL

1.01 SUMMARY

A. Commissioning is intended to achieve the following specific objectives; this section covers the Commissioning Authority's responsibilities for commissioning:
   1. Verify that the work is installed in accordance with the Contract Documents and the manufacturer's recommendations and instructions, and that it receives adequate operational checkout prior to startup: Startup reports and Prefunctional Checklists are utilized to achieve this.
   2. Verify and document that functional performance is in accordance with the Contract Documents: Functional Tests performed by Contractor and witnessed by the Commissioning Authority are utilized to achieve this.
   3. Verify that operation and maintenance manuals submitted to Owner are complete: Detailed O&M data submittals are specified.
   4. Verify that the Owner's operating personnel are adequately trained: Formal training conducted by Contractor is specified.

B. Commissioning, including Functional Tests, O&M documentation review, and training, is to occur after startup and initial checkout and be completed before Substantial Completion.

C. Coordinate and direct all the commissioning activities in a logical, sequential and efficient manner using consistent protocols and forms, centralized documentation, clear and regular communications and consultations with all necessary parties, frequently updated timelines and schedules and technical expertise.

D. The Commissioning Authority is to be employed by Owner.

E. The scope of commissioning activities is defined in Section 01 91 13 - General Commissioning Requirements.

F. Contractor's responsibilities are defined in Section 019 113 - General Commissioning Requirements.

1.02 REFERENCE STANDARDS

A. ASHRAE Guideline 1.1 - The HVAC Commissioning Process; 2012

B. PECI (MCP) - Model Commissioning Plan; Portland Energy Conservation, Inc.; located at http://www.peci.org/library/mcpgs.htm; current edition.

1.03 SUBMITTALS

A. Commissioning Plan:
   1. Submit preliminary draft for review by Owner and Architect within 30 days after commencement of Commissioning Authority contract.
   2. Submit revised draft to be included in the construction contract documents, not less than 4 weeks prior to bid date.
   3. Submit final plan not more than 90 days after commencement of construction, for issuance to all parties.

B. List of Prefunctional Checklists to be developed:
   1. Submit preliminary list at start of construction documents phase or within 30 days after commencement of contract, whichever is later.
   2. Submit revised list not less than 6 weeks prior to bid date, for inclusion in the construction contract documents.
   3. Submit final list not more than 60 days after start of construction.

C. Prefunctional Checklists:

1. Submit preliminary draft at start of construction documents phase or within 30 days after commencement of contract, whichever is later.
2. Submit revised draft for review by Owner and Architect not less than 6 weeks prior to bid date, for inclusion in the construction contract documents.
3. Submit final draft to Contractor not less than 4 weeks prior to startup of particular items to be commissioned.

D. List of Functional Test procedures to be developed:
1. Submit preliminary list at start of construction documents phase or within 30 days after commencement of contract, whichever is later.
2. Submit revised list not less than 6 weeks prior to bid date, for inclusion in the Contract Documents; this is intended to be a list of titles, not full description of the tests.
3. Submit final list not more than 60 days after start of construction.

E. Functional Test Procedures:
1. Submit preliminary draft at start of construction documents phase or within 30 days after commencement of contract, whichever is later.
2. Submit revised draft for review by Owner and Architect not less than 6 weeks prior to bid date, for inclusion in the construction contract documents.
3. Submit final draft to Contractor not less than 4 weeks prior to startup of particular items to be commissioned.

F. Training Plan.

G. Commissioning Record: Submit to Contractor for inclusion with O&M manuals.

H. Final Commissioning Report: Submit to Owner.

I. Recommissioning Manual: Submit within 60 days after receipt of Owner's instructions to proceed with preparation.

PART 2 PRODUCTS

2.01 DOCUMENTATION IDENTIFICATION SYSTEM

A. Give each submitted form or report a unique identification; use the following scheme.

B. Type of Document: Use the following prefixes:
1. Commissioning Plan: CP-.
2. Prefunctional Checklist: PC-.
3. Functional Test Procedure: FTP-.
4. Functional Test Report: FTR-.
5. Commissioning Report: CR-.

C. System Type: Use the first 4 digits from CSI/CSC MasterFormat, 2004 Edition, that are applicable to the system; for example:
1. 2300: HVAC system as a whole.
2. 2320: HVAC Piping and Pumps.
3. 2330: HVAC Air Distribution.

D. Component Number: Assign numbers sequentially, using 1, 2, or 3 digits as required to accommodate the number of units in the system.

E. Test, Revision, or Submittal Number: Number each successive iteration sequentially, starting with 1.

F. Example: PC-2320-001.2 would be the Prefunctional Checklist for equipment item 1 in the HVAC piping system, probably a pump; this is the second, revised submittal of this checklist.

PART 3 EXECUTION

3.01 COMMISSIONING PLAN

A. Prepare and maintain the Commissioning Plan, covering commissioning schedule, Prefunctional Checklist and Functional Test procedures, coordination requirements, and forms to be used, for all parties in the commissioning process.
   1. Call and chair meetings of the Commissioning Team when appropriate.
   2. Give Contractor sufficient notice for scheduling commissioning activities.
   3. Develop a comprehensive start-up and initial systems checkout plan with cooperation of Contractor and subcontractors.
   4. The PECI Model Commissioning Plan may be used as a guide for the Commissioning Plan.
   5. ASHRAE Guideline 1 may be used as a guide for the Commissioning Plan.
   6. Avoid replication of information included in the construction contract documents to the greatest extent possible.

B. Review the construction contract documents for Contractor submittals of draft checklists, draft test procedures, manufacturer startup procedures, and other information intended for the use of the Commissioning Authority in preparing the Commissioning Plan.

C. Commissioning Schedule:
   1. Coordinate with Contractor anticipated dates of startup of each item of equipment and system.
   2. Contractor's scheduling responsibilities are specified in the construction contract documents.
   3. Revise and re-issue schedule monthly.
   4. Prefunctional Checklists and Functional Tests are to be performed in sequence from components, to subsystems, to systems.
   5. Deliver relevant Prefunctional Checklists and Functional Test Procedures to Contractor in time to avoid delay.

3.02 CONSTRUCTION CONTRACT DOCUMENTS

A. General Commissioning Specifications: Architect has prepared general commissioning specifications for inclusion in the construction contract documents; review and submit comments to Owner.
   1. These specifications include:
      a. Procedures applicable to all types of items to be commissioned.
   2. Prepare specifications for any of the following that would be recommended, for incorporation into the construction contract documents by Architect:
      a. Additional Contractor submittals needed for purposes of commissioning, such as startup procedures, draft test procedures, draft training plans, etc.
      b. Additional Owner personnel training.
      c. Additional operation or maintenance data that should be submitted.

B. Prefunctional Checklists: Develop detailed Checklists for each item to be commissioned.
   1. List of Checklists to be Developed: Prepare and maintain a detailed list of titles, not full text.
   2. The Checklist forms are intended to be part of the Contractor's Contract Documents.

C. Functional Testing: Develop detailed procedures for each item to be commissioned; submit for review by Owner and Architect.
   1. List of Test Procedures to be Developed: Prepare and maintain a detailed list of titles, not full text.
   2. The forms the Commissioning Authority will use to report Functional Test results are not intended to be part of Contractor's Contract Documents, but the Functional Test Procedures that must be executed by the Contractor must be made part of the Contract Documents, by modification if necessary.

D. Develop any other reporting forms Contractor will be required to use; if they are likely to require a substantially different amount of work than the Contractor can reasonably anticipate, they must be included in the construction contract documents.

E. If any part of the documents described above have not been developed by the bid date, coordinate with Architect the issuance of modifications to the construction contract documents

3.03 PREFUNCTIONAL CHECKLISTS

A. Prefunctional Checklists - Content: Prepare forms for Contractor's use, in sufficient detail to document that the work has been installed in accordance with the Contract Documents and the manufacturer's recommendations and instructions, and that it receives adequate operational checkout prior to startup.
   1. Prepare separate Checklists for each type of equipment, system, or other assembly, customized to the item.
   2. Identify each Checklist by using the contract documents identification number or name, if any; if none, create unique identifiers for each Checklist; do not rely on Contractor to number checklists.
   3. Multiple identical or near-identical items may appear on a single Checklist provided there is space to record all required data for each separately; label each set of data uniquely.
   4. Include space to record manufacturer name, model number, serial number, capacity and other relevant characteristics, and accessories and other features as applicable; include space to record "as specified", "as submitted", and "as installed" data.
   5. Include space to record whether or not the required submittals have been received; list each separate type of submittal.
   6. Include line items for each physical inspection to be performed.
   7. Include line items for each operational inspection to be performed, such as checking switch operation, fan rotation, valve and damper stroke, and measuring actual electrical loads.
   8. Include separate section for sensors and actuators, with space for documenting actual physical location and calibration measurements; provide a separate generic calibration checklist identified wherever referenced.
   9. Include spaces to record that related Checklists for related work upon which this work depends have been completed.

B. Prefunctional Checklists - Format:
   1. Provide a cover sheet showing name of equipment item or system, documentation identification number (see Documentation Identification Scheme), names of accessory components involved, and identification of related checklists.
   2. Include on cover sheet space for Contractor's use in attesting to completeness; provide spaces for the signatures of the general contractor and each subcontractor or other entity responsible, customized to the project and the type of item.
   3. Include on the cover sheet, above the signature block, the following statement: "The work referenced in this Checklist and other work integral to or dependent on this work is complete and ready for functional testing. The checklist items are complete and have been checked off only by parties having direct knowledge of the event." Include two checkboxes:
      a. "This Checklist is submitted for approval with no exceptions."
      b. "This Checklist is submitted for approval, subject to the attached list of outstanding items, none of which preclude the performance of safe and reliable functional tests. A statement of completion will be submitted upon completion of the outstanding items."
   4. Use a consistent, tabular format for all Checklists, with one line per checklist activity.
   5. For each line item, provide space for initials and date, and identification of the subcontractor or other entity responsible.

3.04 FUNCTIONAL TEST PROCEDURES

A. Develop test procedures in sufficient detail to show that functional performance is in accordance with the Contract Documents and shows proper operation through all modes of

operation where there is a different system response, including seasonal, unoccupied, warm-up, cool-down, part- and full-load.

1. Obtain assistance and review by installing subcontractors.
2. Itemize each test sequence in step-by-step order, with acceptance criteria for each step and for the test as a whole.
3. Include test setup instructions, description of tools and apparatus, special cautions, and.
4. Avoid procedures that would void or otherwise limit warranties; review with Contractor prior to execution.
5. For HVAC systems, procedures may include energy management control system trending, stand-alone datalogger monitoring or manual functional testing.
6. Obtain explicit approval of Contractor in regard to feasibility and safety prior to execution.

B. Functional Test Report Forms: Prepare forms in advance of testing, using a consistent format; include all test procedure information given to Contractor and:

1. Report Identifier (see Documentation Identification Scheme).
2. Test prerequisites.
3. Formulas to be used in calculations.
4. Yes/No check boxes for each step of test.
5. Space to record results, document deficiencies, and make recommendations.
6. Signature and date block for Commissioning Authority.

C. Functional Test Prerequisites: Include space to verify all of the following items on each Functional Test Report Form, unless truly inapplicable:

1. All related equipment has been started up and start-up reports and Prefunctional Checklists submitted and approved ready for Functional Testing.
    a. For hydronic systems, check that:
        1) Piping system flushing is complete and required report approved.
        2) Water treatment system is complete and operational.
        3) Test and balance (TAB) is complete and approved.
2. All control system functions for this and all interlocking systems are programmed and operable in accordance with the Contract Documents, including final set points and schedules with debugging, loop tuning and sensor calibrations completed, with space for signature of controls installer.
3. Incomplete items identified by Architect during closeout inspections have been corrected or completed.
4. Safeties and operating ranges have been reviewed.
5. A copy of the specified sequence of operation is attached.
6. A copy of applicable schedules and setpoints is attached.
7. A copy of the specified Functional Test Procedures is attached.
8. The Functional Test Procedures have been reviewed and approved by the applicable installer.
9. Vibration control report approved (if required).
10. False loading equipment, system and procedures ready.
11. Sufficient clearance around equipment for servicing.
12. Original values of pre-test setpoints that need to be changed to accommodate testing have been recorded, with a check box provided to verify return to original values (include control parameters, limits, delays, lockouts, schedules, etc.).
13. Any other items on the Prefunctional Checklist or Start-up Reports that need to be re-verified.

3.05 CONSTRUCTION PHASE

A. Coordinate the commissioning work with Contractor and Construction Manager, ensure that commissioning activities are being incorporated into the master schedule.

B. Perform site visits, as necessary, to observe component and system installations. Attend planning and job-site meetings to obtain information on construction progress. Review

Contractor's meeting minutes for issues relating to the commissioning process. Assist in resolving discrepancies.

C. Commissioning Kick-Off Meeting: Plan and conduct a meeting early in the construction phase to review commissioning activities and responsibilities with all parties involved. Require attendance by all members of the Commissioning Team.

D. Conduct periodic meetings as necessary to coordinate, resolve planning issues, and aid in resolution of deficiencies, minimizing the time spent by Contractor and Owner personnel; hold meetings at least monthly.

E. Submit periodic progress reports to Owner and Contractor.

F. Review Contractor shop drawing submittals applicable to systems being commissioned for compliance with commissioning needs; verify that Owner's responsibilities are clearly defined in warranties.

G. Review and approve submittals directly related to commissioning.

H. Deliver Prefunctional Checklists and Functional Test procedures to Contractor.

I. Verify satisfactory completion of Prefunctional Checklists by Contractor by reviewing checklists and by site observation and spot checking; provide formal approval when satisfactory.

J. Verify startup of all systems by reviewing start-up reports and by site observation; provide formal approval when satisfactory.

K. Coordinate, witness and approve Functional Tests performed by Contractor. Coordinate retesting until satisfactory performance is achieved.

L. HVAC Commissioning:
   1. Gather and review the control sequences and interlocks and work with Contractor and design engineers until sufficient clarity has been obtained, in writing, to be able to prepare detailed Functional Test procedures.
   2. Witness all or part of HVAC piping test and flushing procedures, sufficient to be confident that proper procedures were followed; document testing and include documentation in O&M manuals.
   3. Witness all or part of duct testing and cleaning procedures, sufficient to be confident that proper procedures were followed; document testing and include documentation in O&M manuals.
   4. Review TAB Plan prepared by Contractor.
   5. Before TAB is executed, witness sufficient Functional Testing of the control system to approve it to be used for TAB.
   6. Verify air and water systems balancing by spot testing, by reviewing completed reports, and by site observation; provide formal approval when satisfactory.
   7. Analyze trend logs and monitoring data to verify performance.

M. Witness and document testing of systems and components over which the Commissioning Authority does not have direct control, such as smoke control systems, tests contracted directly by Owner, and tests by manufacturer’s personnel; include documentation in O&M manuals.

N. When Functional Testing for specific systems or equipment is specified to be performed by the Commissioning Authority rather than the Contractor, perform such testing without assistance of Contractor.

O. Maintain a master deficiency and resolution log and a separate testing record. Provide written progress and test reports with recommended actions.

P. O&M Data: Review submitted operation and maintenance data for completeness; provide formal approval if satisfactory.

Q. Notify Contractor and Owner of deficiencies in procedures or results; suggest solutions.

3.06 TRAINING

A. Training Plan: Prepare a comprehensive Training Plan, incorporating draft training plans submitted by Contractor.

1. Include a two hour, or as necessary, session by the HVAC design engineer covering the overall HVAC system and equipment design concepts, with one-line schematic drawings.
2. Include a two hour, or as necessary, session by the Commissioning Authority on the use of the blank Prefunctional Checklists and Functional Test report forms for re-commissioning purposes.
3. Establish criteria for determining satisfactory completion of training.

B. Verify that training was satisfactorily completed; provide formal approval if satisfactory.

3.07 CLOSEOUT

A. Commissioning Record: Use the same format and organization as specified for the O&M manuals.
1. Include the Final Commissioning Plan and Final Report.
2. For each product or system and equipment item, include the following organized as indicated, with separator tabs:
a. Design intent documentation, furnished by Architect or others.
b. Detailed operational sequences.
c. Startup plan and approved startup reports.
d. Filled out Prefunctional Checklists.
e. Filled out Functional Test reports; trend logs and monitoring reports and analysis; other verification documentation.
f. Training plan and training records.
g. Recommissioning recommendations, including time schedule and procedures; include blank copies of all Prefunctional Checklists and Functional Test report forms.

B. Final Commissioning Report: Include:
1. Executive summary.
2. List of participants and roles.
3. Brief facility description.
4. Overview of commissioning scope and general description of testing and verification methods.
5. For each item commissioned, an evaluation of adequacy of:
a. The product itself; i.e. compliance with the contract documents.
b. Installation.
c. Functional performance; include a brief description of the verification method used and observations and conclusions from the testing.
d. O&M documentation, including design intent.
e. Operator training.
6. List of all outstanding non-compliance items, referenced to the specific functional test, inspection, trend log, etc., where the deficiency is documented.
7. List of unresolved issues, seasonal or deferred testing, and other concerns that could affect facility operation.
8. Recommendations for improvement to equipment or operations, future actions, commissioning process changes, etc. (about four to six pages).
9. Attach appendices containing all commissioning documentation, including logs, minutes, reports, deficiency lists, communications, findings, etc., except that specified to be part of the Commissioning Record.

C. Recommissioning Manual: Revise the Commissioning Plan documents, checklists, and Functional Test forms as necessary based on accepted recommendations of the final Commissioning Report. Provide step-by-step instructions for recommissioning, blank forms, and cross-references to O&M data needed during recommissioning.

3.08 POST-OCCUPANCY PHASE

A. Coordinate deferred and seasonal Functional Tests; verify correction of deficiencies.

B. On-Site Review: 10 months after Substantial Completion conduct on-site review with Owner's staff.

1. Review the current facility operation and condition of outstanding issues related to the original and seasonal commissioning.
2. Interview staff to identify problems or concerns they have operating the facility as originally intended.
3. Make suggestions for improvements and for recording these changes in the O&M manuals.
4. Identify areas of concern that are still under warranty or are the responsibility of the original construction contractor.
5. Assist facility staff in developing reports, documents and requests for services to remedy outstanding problems.

END OF SECTION

SECTION 02 32 10
SUBSURFACE EXPLORATIONS

PART 1 - GENERAL

1.01 GEOTECHNICAL REPORT AND SAMPLES

A. On May 30, 2014, soils investigations (test borings) were conducted and a report prepared for the Owner by S.W. Cole Engineering, Inc of 286 Portland Road, Gray, Maine. This report, titled "Proposed Senior Living Facility, The Park Danforth", dated September 30, 2014, was provided for the use of the Architect in the design of the Project. Part of the information contained in this report is interpretive (not factual) and therefore shall not be considered as part of the information available to others. This report is available for viewing at the office of Construction Manager

1.02 SUBSURFACE CONDITIONS

A. The Owner has explored subsurface conditions and authorized soil investigations on site.

B. Factual subsurface information, boring logs, test pit logs and grain size distribution report, are part of the geotechnical report. The logs describe subsurface conditions encountered at the exploration locations at the time explorations were made. Actual subsurface conditions may vary due to conditions not evident at the time explorations were made. No warranties, expressed or implied, are made as to accuracy of subsurface information provided herein.

C. No warranty is made of the continuity of strata or material between the exploration locations. The stratification lines on the logs represent approximate boundaries between soil types. The actual transitions between soil types may be gradual.

D. Water level readings have been observed in the drill holes at times and under conditions stated on the boring logs. It must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other factors not evident at the time of drilling when the measurements were made.

E. Boring and test pit locations shown on the drawings are approximate only and the Owner and Architect, including their consultants, make no representations regarding correctness of such information.

F. Bidders shall make their own deductions of subsurface conditions which may affect methods or cost of construction. Bidders may, at their own expense, and upon application to the Owner, conduct additional subsurface testing.

1.03 USE OF DATA

A. These investigations were obtained by the Owner only for the Architect's use in design, and are not a part of the Contract Documents. It is understood that neither the Owner, Architect, nor their engineering consultants shall be responsible for any interpretations or conclusions drawn there from by Bidders or the Contractor with regard to the interpretive data or geotechnical report. The Owner and Architect, including their engineering consultants, claim no responsibility for or endorsement of any construction methods, means, or techniques which may be contained in or implied by the above referenced logs and report.

B. Bidders shall visit the site and familiarize themselves with all existing conditions. Prior to bidding, Bidders may make their own subsurface investigations to satisfy themselves as to site and subsurface conditions, but all such investigations shall be performed under time schedule and arrangements approved in advance by the Owner.

C. The Owner and Architect, including their consultants, cannot guarantee the continuity of subsurface conditions between test locations. The Owner and Architect, including their consultants, cannot guarantee the accuracy or completeness of related documents and reports.

D. The Contractor must interpret the subsurface data relying upon his own judgment and acknowledges that he is not relying upon the information in the geotechnical report to accurately describe the subsurface conditions that may be found to exist.

E. It is expressly understood that the Owner and Architect, including their consultants, shall not be responsible for any deduction, interpretation, or conclusion made by any Bidder or Contractor.

F. No claim for extra cost or extension of time resulting from the Bidder or Contractor's deductions, interpretations, or conclusions shall be allowed.

END OF SECTION

SECTION 03 30 00
CAST -IN-PLACE CONCRETE

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. The drawings and general conditions of the contract including General and Supplementary Conditions and other Division 1 Specification sections apply to work of this section.

B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.

C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.02 DESCRIPTION OF WORK:

A. Work included: Provide labor, materials, and equipment necessary to complete the work of this Section and, without limiting the generality thereof, furnish and include the following:

1. The extent of cast-in-place concrete work is shown on drawings and includes (but not by way of limitation) formwork, reinforcing, cast-in-place concrete, accessories, finishing, and casting in of items specified under other Sections of the Specifications or furnished by Owner that are required to be built-in with the concrete.
2. Equipment support pads indicated on mechanical drawings to be installed by the Building Contractor.
3. Cast-in-place retaining walls, exterior slabs on grade and other concrete shown on site drawings.

1.03 RELATED WORK:

A. Metal Fabrications: Section 05 50 00
   1. Expansion Anchors - Section 05 12 00
   2. Embedded Items - Section 05 50 00

B. Anchor Bolts: Section 05 12 00

C. Joint Sealants: Division 7

D. Underslab Vapor Retarders/Wall Waterproofing: Division 7

1.04 QUALITY ASSURANCE:

A. Codes and Standards: Comply with provisions of the latest edition of the following except where more stringent requirements are shown or specified:

1. ACI “Manual of Concrete Practice”.
2. ACI 117 “Standard Specifications for Tolerances for Concrete Construction and Materials”.
3. ACI 211.1 "Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete."
4. ACI 212.3R "Chemical Admixtures for Concrete."
5. ACI 301 "Specifications for Structural Concrete for Buildings."
6. ACI 302.1R "Guide for Concrete Floor and Slab Construction."

7. ACI 304R "Guide for Measuring, Mixing, Transporting and Placing Concrete."
8. ACI 304.2R "Placing Concrete by Pumping Methods."
9. ACI 306 R "Cold Weather Concreting."
10. ACI 308 “Standard Practice for Curing Concrete."
11. ACI 309R "Guide for Consolidation of Concrete."
12. ACI 315 "ACI Detailing Manual."
13. ACI 318 "Building Code Requirements for Reinforced Concrete."
14. ACI 347R "Guide to Formwork for Concrete."
15. Concrete Reinforcing Steel Institute, "Placing Reinforcing Bars."
16. AISC “Code of Standard Practice for Steel Buildings and Bridges.”
17. “Code of Federal Regulations, Part 1926” per the Occupational Safety and Health Administration (OSHA), Department of Labor (Latest Revision).

B. Materials and installed work may require testing and retesting, as directed by the Architect, at any time during progress of work. Allow free access to material stockpiles and facilities. Tests not specifically indicated to be done at Owner's expense, including retesting of rejected materials and installed work, shall be done at Contractor's expense.

1.05 SUBMITTALS:

A. Unless otherwise specified, submittals required in this section shall be submitted for review. Submittals shall be prepared and submitted in accordance with Division 1.

B. General Contractor shall submit a Submittal Schedule to the engineer within 30 days after they have received the Owner’s Notice to Proceed.

C. All submittals shall be reviewed and returned to the Architect within 10 working days.

D. Incomplete submittals will not be reviewed.

E. Submittals not reviewed by the General Contractor prior to submission to the Engineer will not be reviewed. Include on the submittal statement or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in this Section and Division 1 have been complied with.

F. Engineer will review submittals a maximum of two review cycles as part of their normal services. If submittals are incomplete or otherwise unacceptable and re-submitted, General Contractor shall compensate Engineer for additional review cycles.

G. Hardcopy Submittals: Submit three prints. Prints will be reviewed by the Engineer, and then the Architect. One marked print will be returned to Contractor for printing and distribution. Multiple copies will not be marked by the Engineer.

H. Electronic Submittals:

1. Contractor shall include in the submittal schedule an indication of submittals that are intended to be submitted electronically. Upon receipt of the submittal schedule, the Engineer reserves the right to indicate submittals that will not be accepted electronically. Paper copies of such submittals shall be furnished as referenced in this specification.

2. The Engineer reserves the right to require paper copies of submittals that are received electronically. Provide Engineer one (1) paper copies in addition to the electronic submittal. Paper copy will be retained and electronic copy will be returned. Review cycle for such submittals shall not commence until such time that the paper copies are received.

3. Electronic Submittals shall be submitted in Protected Document Format (PDF) compatible with Bluebeam version 12 or later. Electronic files shall not be broken into smaller individual files. File sizes too large to process email or within a file transfer protocol (FTP) site shall be provided on a CD.
4. The submission of submittals electronically does not relieve the contractor of their responsibility to review the submittal prior to transmission to the Engineer. Electronic Submittals shall include contractor comments, and a statement and/or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in this Section and Division 1 have been complied with. Electronic submittals without the Contractor's approval will be rejected and returned.
5. The Engineer assumes no responsibility for the printed reproduction of submittals reviewed electronically, transmission errors or returned electronic submittals that become corrupted or are otherwise not accessible by the Contractor's or Subcontractor's computer hardware and/or software.

I. Product Data: Submit producer's or manufacturer's specifications and installation instructions for the following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).
   1. Reinforcement certified mill reports covering chemical and physical properties and yield strength.
   2. Patching products.
   3. Non-shrink grout.
   4. Curing compounds, where applicable.
   5. Admixtures.
   6. Expansion/Adhesive Anchors.

J. Shop Drawings:
   1. Shop Drawing Preparation: Electronic files of structural drawings will not be provided to the contractor for preparation of shop drawings. Reproduction of any portion of the Construction Documents for use as Shop drawings is prohibited. Shop drawings created from reproduced Construction Documents will be returned without review. Submit shop drawings for fabrication, bending and placement of concrete reinforcement. Comply with ACI 315, showing bar schedules, stirrup and tie spacing, diagrams of bent bars, and arrangement of concrete reinforcement. Include special reinforcement required at openings through concrete elements. Include supplemental reinforcing and bar supports necessary to support reinforcing steel at proper location within forms or slabs.
      a. Review of the shop drawings will be made for the size and arrangement of reinforcement. Conformance of the Shop Drawings to the Contract Drawings remains the responsibility of the General Contractor. Engineer's review in no way relieves the General Contractor of this responsibility.

b. Shop drawings will not be reviewed as partial submittals. A complete submittal shall be provided all items listed prior. **Incomplete submittals will not be reviewed.**

K. Mix designs: Submit all laboratory test reports and materials for each mix design listed within. Prepare mixes by the field experience method and/or trial mixtures per the requirements of chapter 5 of ACI 318. Include the calculation of average strength and standard deviation. Proportioning by water cement ratio method will not be permitted.

L. Samples: Submit samples of materials as specified and as otherwise requested by Architect, including names, sources and descriptions.

M. Curing Methods: Submit documentation of curing methods to be used for review. Account for anticipated project temperature ranges and conditions in curing methods.

N. Contraction/Construction Joints: Submit plan indicating proposed location of contraction and construction joints in walls and slabs.

O. Test Reports: Test reports shall be submitted to the Owner, Architect and Engineer within 48 hour after completion of each test.

PART 2 PRODUCTS

2.01 FORM MATERIALS:

A. Forms for Exposed Finish Concrete: Unless otherwise indicated, construct formwork for exposed concrete surfaces with plywood, metal, metal-framed plywood faced or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings. Provide form material with sufficient thickness to withstand pressure of newly-placed concrete without bow or deflection.

1. Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood", Class I, Exterior Grade or better, mill-oiled and edge-sealed, with piece bearing legible inspection trademark.

B. Forms for Unexposed Finish Concrete: Form concrete surfaces which will be unexposed in finished structure with plywood, lumber, metal or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.

C. Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

2.02 REINFORCING MATERIALS:

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

B. Welded Wire Fabric: ASTM A 185, welded steel wire fabric. Provide welded wire fabric in flat sheets.

C. Plate Dowels/Load Plates with Support Baskets: PNA Construction Technologies, Inc.; Manufacturer's representative: (508) 238-6775

D. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers, and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use plastic, wire bar type supports or concrete block supports complying with CRSI recommendations, unless otherwise specified. Wood, clay brick and other unspecified devices are not acceptable.

1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.

2. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class I) or stainless steel protected (CRSI, Class 2).

2.03 CONCRETE MATERIALS:

A. Single-Source Supplier: Ready-mix concrete shall be from one supplier unless specific written approval is received from the Structural Engineer.

B. Portland Cement: ASTM C 150, Type I or Type II, unless otherwise approved Use one brand of cement throughout project, unless otherwise acceptable to Architect.

C. Normal Weight Aggregates: ASTM C 33. Provide from a single source for exposed concrete. Do not use aggregates containing soluble salts or other substances such as iron sulfides, pyrite, marcasite, or ochre which can cause stains on exposed concrete surfaces.

D. Light Weight Aggregates: ASTM C 330.

E. Water: Potable.

F. Air-Entraining Admixture: ASTM C 260.

G. High-Range Water-Reducing Admixture (Super Plasticizer): ASTM C 494, Type F or Type G containing not more than 1% chloride ions.

H. Fiber reinforcement shall be Type III Synthetic Virgin Homopolymer Polypropylene Fibers conforming to ASTM C1116. Fiber reinforcing shall be added and distributed prior to incorporation of Super Plasticizer.

I. Normal range water reducing admixture: ASTM C 494 Type A containing no calcium chloride.

J. Accelerating Admixture: ASTM C 494, Type C or E.

K. Blast Furnace Slag: ASTM C989

L. Fly Ash: ASTM C618, Class C or F

M. Calcium Chloride is not permitted.

2.04 RELATED MATERIALS:

A. Underslab Vapor Retarder: Provide vapor retarder over prepared sub base. Refer to architectural drawings, geotechnical report and/or division 7 specifications for additional requirements and vapor retarder location.

B. Non-Shrink Cement-based Grout: Provide grout consisting of pre-measured, prepackaged materials supplied by the manufacturer requiring only the addition of water. Manufacturer's instructions must be printed on the outside of each bag.

1. Non-shrink: No shrinkage (0.0%) and a maximum 4.0% expansion when tested in accordance with ASTM C-827. No shrinkage (0.0%) and a maximum of 0.3% expansion in the hardened state when tested in accordance with CRD-C-621.
2. Compressive strength: A minimum 28 day compressive strength of 5000 psi when tested in accordance with ASTM C-109.
3. Setting time: A minimum initial set time of 60 minutes when tested in accordance with ASTM C-191.
4. Composition: Shall not contain metallic particles or expansive cement.

C. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M182, Class 2.

D. Moisture-Retaining Cover: One of the following, complying with ANSI/ASTM C 171.
   1. Waterproof paper.
   2. Polyethylene film.
   3. Polyethylene-coated burlap.

E. Liquid Membrane-Forming Curing Compound: Liquid type membrane forming curing compound complying with ASTM C 309, Type I, Class A unless other type acceptable to Architect. Curing compound shall not impair bonding of any material, including floor finishes, to be applied directly to the concrete. Demonstrate the non-impairment prior to use.

F. Preformed Expansion Joint Formers:
   1. Bituminous Fiber Type, ASTM D 1751.
   2. Felt Void, Poly-Styrene Cap with removable top as manufactured by SUPERIOR.

G. Slab Joint Filler: Multi-component polyurethane sealant (self-leveling type).

H. Waterstops shall be Bentonite/Butyl Rubberbased product. Use in conjunction with manufacturer's approved mastic. Acceptable products include:
   1. "Waterstop Rx," by American Colloid Co.
   2. "Adeka Ultra Seal MC-2010," by Asahi Denka Koeyo, Kik MN.

2.05 PROPORTIONING AND DESIGN OF MIXES:

A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 318. Use material, including all admixtures, proposed for use on the project. If trial batch method used, use an independent testing facility acceptable to Architect for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing unless otherwise acceptable to Architect.

B. Submit written reports to Architect of each proposed mix for each class of concrete. Do not begin concrete production until mixes have been reviewed by Architect.

C. Proportion design mixes to provide concrete with the following properties:
   1. Footings and foundation walls
      a. Strength: 3,500 psi at 28 days.
      b. Aggregate: 3/4"
      c. W/C Ratio: 0.55 maximum
      d. Entrained Air: 6% +/- 1.5%
      e. Slump: 4" maximum
   2. Interior slabs on grade at garage:
      a. Strength: 5,000 psi at 28 days
      b. Aggregate: 3/4" minimum, 1 1/2" maximum.
      c. W/C Ratio: 0.40 maximum
      d. Entrained air: 6% +/- 1.5%
      e. Slump: 4" maximum
   3. Interior Slabs on grade (not at garage) and elevated slabs:
      a. Strength: 3,000 psi at 28 days
      b. Aggregate: 3/4" minimum, 1 1/2" maximum.

c. W/C Ratio: 0.54 maximum
d. Entrapped Air only (no entrainment), 2.5% +/- 1%
e. Slump: 4" maximum

4. Exterior Slabs and all other exposed Site Concrete not specified elsewhere:
   a. Strength: 5,000 psi at 28 days
   b. Aggregate: 3/4"
   c. W/C Ratio: 0.40 maximum
   d. Entrained Air: 6% +/- 1.5%
   e. Slump: 4" maximum
5. Add air entraining admixture at manufacturers prescribed rate to result in concrete at point of placement having the above noted air contents.
6. Additional slump may be achieved by the addition of a mid-range or high-range water reducing admixture. Maximum slump after the addition of admixture shall be 6 or 8 inches for mid-range or high range water reducing admixtures, respectively.

D. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor, when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, at no additional cost to Owner and as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Structural Engineer before using in work.
   1. Water may be added at the project only if the maximum specified slump and design mix maximum water/cement ratio is not exceeded.
   2. Additional dosages of superplastisizer should be used when delays occur and required slump has not been maintained. A maximum of two additional dosages will be permitted per ACI 212.3R recommendations.

2.06 CONCRETE MIXING:

A. Job-Site Mixing will not be permitted.

B. Ready-Mix Concrete: Must comply with the requirements of ASTM C 94, and as herein specified. Provide batch ticket for each batch discharged and used in work, indicating project name, mix type, mix time and quantity.
   1. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C94 may be required by Structural Engineer.
   2. When the air temperature is between 85 degrees F. and 90 degrees F., reduce the mixing and delivery time from 1 1/2 hours to 75 minutes, and when the air temperature is above 90 degrees F., reduce the mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.01 FORMS:

A. Design, erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position.

B. Design, construct, erect, maintain, and remove forms for cast-in-place concrete work in compliance with ACI 347.

C. Design formwork to be readily removable without impact, shock or damage to cast-in-place concrete surfaces and adjacent materials.

D. Construct forms to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent leakage of cement paste.

E. Vertical dovetail slots may be required for masonry tie installation. Coordinate dovetail slot spacing and location with division 4 specifications and Architectural drawings.

F. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, dovetail slots, reglets, recesses, and the like to prevent swelling and for easy removal.

G. Provide temporary openings where interior area of formwork is inaccessible for clean out, for inspection before concrete placement and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.

H. Chamfer exposed corners and edges as indicated, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

I. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal.

1. Unless otherwise indicated, provide ties for concrete surfaces to be exposed to view in the final condition so portion remaining within concrete after removal is 1" (minimum) inside concrete.

2. Form ties shall not leave holes larger than 1" diameter in concrete surface. Repair holes left by form ties after removal of formwork.

J. Provision for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.

K. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Retighten forms and bracing after concrete placement as required to eliminate mortar leaks and maintain proper alignment.

3.02 PLACING REINFORCEMENT:

A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.

1. Subgrade tolerance shall conform to a tolerance of +0/-1 1/2". Base tolerance (fine grading) for slabs shall conform to a tolerance of +0”/-3/4” in. Confirm compliance of above tolerances with surveyed measurements taken at 20 ft. intervals in each direction.

2. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.

3. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers, as required.
4. Place reinforcement to obtain specified coverage for concrete protection within tolerances of ACI-318. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
5. Install diamond dowels at construction joints and load plates at contraction joints in slab-on-grade per manufacturer's recommendations and as indicated on Drawings.
6. Install welded wire fabric in flat sheets in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

3.03 JOINTS:

A. Construction Joints: Locate and install construction joints, which are not shown on drawings, so as not to impair strength and appearance of the structure, as acceptable to Architect. Submit plan indicating proposed location of construction joints for review prior to beginning work.

1. Provide keyways at least 1-1/2" deep in construction joints in walls, and slabs; bulkheads reviewed by the Engineer, designed for this purpose may be used for slabs.
2. Roughened surfaces shall be used between walls and footings unless shown otherwise on the drawings. The footing surface shall be roughened to at least an amplitude of 1/4" for the width of the wall before placing the wall concrete.
3. Place construction joints perpendicular to the main reinforcement. Continue reinforcement across construction joints.
4. Joints in slabs on grade shall be located and detailed as indicated on the drawings. If saw-cut joints are required, the early-entry dry-cut process shall be used. Refer to ACI 302, section 8.3.12.

3.04 INSTALLATION OF EMBEDDED ITEMS:

A. General: Set, securely anchor and build into work prior to concrete placement all anchorage devices and all other embedded items, including but not by limitation reinforcement, reinforcing dowels, embedded plates, anchor rods, anchor inserts, sleeves, load transfer plates, diamond dowels and shelf bulk heads required for other work that is attached to, bear upon, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto. Notify other trades to permit installation of their work. Templates to be utilized for setting of anchorage devices shall be constructed in a manner to allow mechanical consolidation of concrete without disturbance. Embedments shall be placed in a timely fashion to permit the inspection of embedments prior to concrete placement. **"Wet Setting" of embedded items into plastic concrete is strictly prohibited.**

B. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface.

C. Provide PVC sleeves where pipes and/or conduit pass through exterior concrete or slabs. Sleeves or penetrations shall not be placed through footings, piers, pedestals, drop caps, columns or pilasters unless specifically noted.

D. Tolerances: Tolerances for Anchor Bolts/Rods, other embedded items and bearing surfaces shall meet the requirement set forth in the latest edition of the American Institute of Steel Construction "Code of Standard Practice for Steel Buildings and Bridges," and ACI 117. The more stringent criteria from these documents shall apply.

3.05 INSTALLATION OF GROUT

A. Place grout for base plates in accordance with manufacturer's recommendations.

B. Grout below setting plates as soon as practicable to facilitate erection of steel and prior to removal of temporary bracing and guys. If leveling bolts or shims are used for erection grout shall be installed prior to addition of any column load.

C. 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. For proprietary grout materials, comply with manufacturer's instructions.

3.06 PREPARATION OF FORM SURFACES:

A. Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.

B. Thin form-coating compounds only with thinning agent of type, and in amount, and under conditions of form-coating material manufacturer's directions. Do not allow excess form coating to accumulate in forms or to come into contact with concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

3.07 CONCRETE PLACEMENT:

A. Preplacement Review: Footing bottoms are subject to review by the Geotechnical Engineer. Reinforcement and all concrete preparation work shall be subject to review by the Structural Engineer. Verify that reinforcing, ducts, anchors, seats, plates and other items cast into concrete are placed and securely held. Notify Engineer/Project Special Inspector 48 hours prior to scheduled placement and obtain approval or waiver of review prior to placement. Be sure that all debris and foreign matter is removed from forms.

B. Concrete shall be placed in the presence of an approved testing agency.

C. General: Comply with ACI 304, and as herein specified.

1. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation due to rehandling or flowing.

2. Concrete shall be handled from the mixer to the place of final deposit as rapidly as practicable by methods which will prevent segregation or loss of ingredients and in a manner which will assure that the required quality of the concrete is maintained.

3. Conveying equipment shall be approved and shall be of a size and design such that detectable setting of concrete shall not occur before adjacent concrete is placed. Conveying equipment shall be cleaned at the end of each operation or work day. Conveying equipment and operations shall conform to the following additional requirements:

a. Belt conveyors shall be horizontal or at a slope which will not cause excessive segregation or loss of ingredients. Concrete shall be protected against undue drying or rise in temperature. An arrangement shall be used at the discharge end to prevent apparent segregation. Mortar shall not be allowed to adhere to the return length of the belt. Long runs shall be discharged into a hopper or through a baffle.

b. Chutes shall be metal or metal-lined and shall have a slope not exceeding 1 vertical to 2 horizontal and not less than 1 vertical to 3 horizontal. Chutes more than 20 feet long, and chutes not meeting the slope requirements may be used provided they discharge into a hopper before distribution.

c. Pumping or pneumatic conveying equipment shall be of suitable kind with adequate pumping capacity. Pneumatic placement shall be controlled so that segregation is not apparent in the discharged concrete.

d. Concrete shall not be conveyed through pipe made of aluminum alloy. Standby equipment shall be provided on the site.

e. Tined rakes are prohibited as a means of conveying fiber reinforced concrete.

4. Do not use reinforcement as bases for runways for concrete conveying equipment or other construction loads.

D. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 18 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

1. Consolidate placed concrete by mechanical vibrating equipment. Hand-spading, rodding or tamping as the sole means for the consolidation of concrete will only be permitted with special permission from the Engineer. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.

2. Use vibrators designed to operate with vibratory equipment submerged in concrete, maintaining a speed of not less than 8000 impulses per minute and of sufficient amplitude to consolidate the concrete effectively. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine, generally at points 18 inches maximum apart. Place vibrators to rapidly penetrate placed layer and at least 6 inches into the preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion maintain the duration of vibration for the time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix, generally from 5 to 15 seconds. A spare vibrator shall be kept on the job site during all concrete placing operation.

E. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.

1. Consolidate concrete using internal vibrators during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

2. Bring slab surfaces to correct level with straightedge and strike off. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations. Do not sprinkle water on plastic surface.
3. Maintain reinforcing in proper position during concrete placement operations.
4. Slab thicknesses indicated on the drawings are minimums. Provide sufficient concrete to account for structure deflection, subgrade fluctuations, and to obtain the specified slab elevation at the flatness and levelness indicated here within.
5. Finish: See "Monolithic Slab Finishes" in this specification for slab finish requirements.

F. Cold Weather Placing: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.
1. When air temperature has fallen to or is expected to fall below 40 degrees F (4 degrees C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 degrees F (10 degrees C), and not more than 80 degrees F (27degrees C) at point of placement.
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 and other materials containing antifreeze agents or chemical accelerators.
4. All temporary heat, form insulation, insulated blankets, coverings, hay or other equipment and materials necessary to protect the concrete work from physical damage caused by frost , freezing action, or low temperature shall be provided prior to start of placing operations.
5. When the air temperature has fallen to or is expected to fall below 40 degrees F, provide adequate means to maintain the temperature in the area where concrete is being placed between 50 and 70 degrees F.

G. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.
1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 degrees F. Mixing water may be chilled, or chopped ice may be used to control the concrete temperature provided the water equivalent of the ice is calculated to the total amount of mixing water.
2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that the steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
3. Wet forms thoroughly before placing concrete.
4. Do not use retarding admixtures without the written acceptance by the Architect.

3.08 FINISH OF FORMED SURFACES:

A. Rough Form Finish: For formed concrete surfaces not exposed-to-view in the finish work or by other construction, unless otherwise indicated. This concrete surface shall have texture imparted by form facing material, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4 in. in height rubbed down or chipped off.

B. Smooth Form Finish: For formed concrete surfaces exposed-to-view, or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, damp-proofing, painting or other similar system. This as-cast concrete surface shall be obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.

C. Grout Cleaned Finish: Provide grout cleaned finish to scheduled concrete surfaces which have received smooth form finish treatment. Combine one part Portland cement to 1-1/2 parts fine sand by volume and mix with water to consistency of thick paint. Proprietary additives may be used at Contractor's option. Blend standard Portland cement and white Portland cement, amounts determined by trial patches, so that final color of dry grout will closely match adjacent surfaces.

1. Thoroughly wet concrete surfaces and apply grout to coat surfaces and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.

D. Related Unformed Surfaces: At tops of walls and grade beams, horizontal offset surfaces occurring adjacent to formed surfaces, strike-off, smooth and finish with a texture matching adjacent unformed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.09 FLOOR FLATNESS AND LEVELNESS

A. Floor flatness/levelness tolerances: Tolerances for various floor uses shall conform to the requirements set forth in ACI 117 and ACI 302 for “flat” floor profile.

1. Minimum Test Area Flatness/Levelness: F_F35/F_L25
2. Minimum Local F Number: F_F25/F_L15

B. Levelness criteria shall be applied to slabs-on-grade only.

C. Contractor shall measure floor finish within 72 hours after slab finishing and provide corrective measures for finishes not within tolerance. Corrective procedures shall be reviewed by the Architect prior to implementation.

3.10 MONOLITHIC SLAB FINISHES:

A. Scratch Finish: Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds, and as otherwise indicated.

1. After placing slabs, plane surface to a tolerance not exceeding 1/2 in. in 10 ft. when tested with a 10-ft. straightedge. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms or rakes.

B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, and as otherwise indicated.

C. Trowel Finish: Apply trowel finish to monolithic slab surfaces indicated, including slab surfaces to be covered with carpet, resilient flooring, paint or other thin-film finish coating system.

D. Non-Slip Broom Finish: Apply non-slip broom finish to exterior concrete platforms, steps and ramps, and elsewhere as indicated.

E. Slab finishes for floor coverings not indicated or exposed to view in the final condition shall be coordinated with the Architect prior to slab placement.

F. Slab Joints: Where indicated, sawn slab contraction joints shall be “soft cut”, immediately after concrete surface is firm enough not to be torn or damaged by the blade.

3.11 CONCRETE CURING AND PROTECTION:

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with the requirements of ACI 308 as herein specified.

B. Curing Methods: Perform curing of concrete by moist curing, by moisture-retaining cover curing, by curing compound, and by combinations thereof, as herein specified unless noted otherwise. Curing shall commence as soon as concrete surfaces are sufficiently hard as to withstand surface damage.

C. Curing of Slabs-on Grade:

1. Slabs-on-grade shall be cured by wet curing methods unless otherwise noted.
2. Slabs-on-grade to receive floor coverings with moisture sensitive adhesives shall be cured by means of a moisture retaining covering. Coordinate curing with flooring adhesive manufacturer and flooring installer. Submit curing methods to Architect for review and approval.
3. Slab-on Grade with Barrier 1 Admixture shall be cured by means of a moisture retaining covering in accordance with recommendations of Barrier 1 Admixture Manufacturer.

D. Curing Formed Surfaces: Cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

E. Protection From Mechanical Injury: During the curing period and duration of construction, the concrete shall be protected from damaging mechanical disturbances, such as load stresses, heavy shock, and excessive vibration. All finished concrete surfaces shall be protected from damage by construction equipment, materials, or methods, by application of curing procedures, and by rain or running water. Self-supporting structures shall not be loaded in such a way as to overstress the concrete.

3.12 REMOVAL OF FORMS:

A. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 degrees F for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.

B. Formwork supporting weight of concrete, such as joints, slabs and other structural elements, may not be removed in fewer than 14 days or until concrete has attained design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.

C. Form facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and support.

3.13 REUSE OF FORMS:

A. Clean and repair surfaces of forms to be reused in work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.

B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and latency, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to Architect.

3.14 MISCELLANEOUS CONCRETE ITEMS:

A. Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.

3.15 CONCRETE SURFACE REPAIRS:

A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to the Architect.

1. Cut out honeycomb, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts, down to solid concrete but in no case to a depth of less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush coat the area to be patched with approved bonding agent. Place patching mortar after bonding compound has dried.

2. For exposed-to-view surfaces, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

B. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects, as such, include color and texture irregularities, form tie holes, cracks, spalls, air bubbles, honeycomb, rock pockets, fins, and other projections on surface and stains and other discolorations that cannot be removed by cleaning.

3.16 QUALITY CONTROL TESTING DURING CONSTRUCTION:

A. Testing Agency/Project Special Inspector shall verify reinforcement, including foundation reinforcement and slab reinforcement (WWF or reinforcing bar). Agent shall verify WWF or reinforcement has been chair/placed with proper clearances.

B. The Owner shall employ a Testing Laboratory to inspect, sample and test the materials and the production of concrete and to submit test reports. Concrete testing shall be performed by technicians certified by the Maine Concrete Technician Certification Board and/or ACI Concrete Field Testing Technician Grade I.

C. Concrete shall be sampled and tested for quality control during placement. Quality control testing shall include the following, unless otherwise directed by the Architect.

D. See Submittals section for report requirements.

E. Sampling Fresh Concrete: ASTM C 172.

1. Slump: ASTM C143; One test for each set of compressive strength test specimens. Sample shall be taken from middle third of the load per ASTM C172. A slump test must be run prior to the incorporation of the CFP fibers per recommendations of ACI 544. A slump test must be run prior to and following the addition of a water reducer (superplasticizer) per recommendations of ACI 301.
2. Air Content: ASTM C231 "Pressure method for normal weight concrete." One test for each set of compressive strength specimens measured at point of discharge.
3. Concrete Temperature: Per ASTM C-1064; One test each time a set of compression test specimens are made.
4. Compression Test Specimen: ASTM C31; one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
    a. An insulated Cure Box for specimen curing shall be supplied by Testing Agency for initial curing as defined in ACI C31.
    b. Means of heating or cooling the Cure Box shall be provided by the Inspection Agency if required in order to maintain a temperature between 60 and 80 degrees F. Contractor shall provide an electrical source to the Testing Agency when required for temperature control.
    c. A maximum-minimum thermometer shall be provided in the Cure Box by the Testing Agency to record the temperature range of the Cure Box during specimen curing. The Testing Agency shall record the maximum/minimum temperature of the Cure Box when transferring the specimens to the laboratory.
    d. Test Specimens shall be moist cured.
    e. Refer to ACI C31 for additional requirements for Test Specimens.
5. Compressive Strength Tests: ASTM C39; one set for each 50 cu. yds. or fraction thereof, of each concrete class placed in any one day or for each 4,000 sq. ft. of surface area placed; 1 specimen tested at 7 days, 2 specimens tested at 28 days, 1 specimen retained in reserve for later testing if required.
6. Pumped concrete shall be tested at point of discharge per ACI 301.

F. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by the Architect. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42, or by other methods, as directed. Contractor shall pay for such tests conducted, and any other additional testing as may be required, when unacceptable concrete is verified.

END OF SECTION

SECTION 03 41 00
STRUCTURAL PRECAST CONCRETE

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. The drawings and general conditions of the contract including General and Supplementary Conditions and other Division 1 Specification sections apply to work of this section.

B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.

C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.02 DESCRIPTION OF WORK:

A. Extent of structural precast concrete work is shown on drawings and in schedules.

B. The extent of Structural Precast Concrete is shown on drawings and includes (but not by way of limitation) precast (prestressed if required by design) concrete balconies, all bearing materials, embedded items and accessories.

1.03 RELATED WORK:

A. Section 03 30 00 - Cast in Place Concrete

B. Section 05 12 00 – Structural Steel

C. Section 05 50 00 - Metal Fabrications

D. Division 7 - Joint Sealants

1.04 QUALITY ASSURANCE:

A. Codes and Standards: Comply with the provisions of the latest edition of the following except where more stringent requirements are shown or specified:

1. ACI 301 "Specifications for Structural Concrete for Buildings."
2. ACI 318 "Building Code Requirements for Reinforced Concrete."
3. Concrete Reinforcing Steel Institute, "Manual of Standard Practice."
4. Precast/Prestressed Concrete Institute, “PCI Design Handbook, Precast and Prestressed Concrete.”
5. Precast/Prestressed Concrete Institute MNL 116, "Manual for Quality Control for Plants and Production of Precast Concrete Products."
6. AWS D1.1 - 2004 “Structural Welding Code” - Steel
7. “Code of Federal Regulations, Part 1926” per the Occupational Safety and Health Administration (OSHA), Department of Labor (Latest Revision).

B. Fabricator Qualifications:

1. Fabricator must be an active producer member of the Prestressed Concrete Institute (PCI) and participate in its Plant Certification Program. Manufacturer shall be certified at time of bidding and for duration of project in Category C2. Certificate shall be submitted for record purposes.
2. Firms must have a minimum of 5 years successful experience in fabrication of precast concrete units similar to units required for this project.

3. Fabricator must have sufficient production capacity to produce required units without causing delay in work.

C. Erector's Qualifications:

1. Regularly engaged for at least 5 years in the erection of precast structural concrete similar to requirements of this project.
2. Qualifications for Welding Work: Qualify welding processes and welding operators in accordance with AWS D1.1 "Standard Qualification Procedure."
   a. Provide certification that welders to be employed in work have satisfactorily passed AWS D1.1 qualification tests and maintained a current certification. Current certification and/or continuity log shall be submitted and be available in the shop and field at all times.
   b. If re-certification of welders is required, retesting will be the Contractor's responsibility.

1.05 SUBMITTALS:

A. Unless otherwise specified, submittals required in this section shall be submitted for review. Submittals shall be prepared and submitted in accordance with Division 1.

B. General Contractor shall submit a Submittal Schedule to the engineer within 30 days after they have received the Owner's Notice to Proceed.

C. All submittals shall be reviewed and returned to the Architect within 10 working days.

D. InComplete submittals will not be reviewed.

E. Submittals not reviewed by the General Contractor prior to submission to the Engineer will not be reviewed. Include on the submittal statement or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in this Section and Division 1 have been complied with.

F. Engineer will review submittals a maximum of two review cycles as part of their normal services. If submittals are incomplete or otherwise unacceptable and re-submitted, General Contractor shall compensate Engineer for additional review cycles.

G. Hardcopy Submittals: Submit three prints. Prints will be reviewed by the Engineer, and then the Architect. One marked print will be returned to Contractor for printing and distribution. Multiple copies will not be marked by the Engineer.

H. Electronic Submittals:

1. Contractor shall include in the submittal schedule an indication of submittals that are intended to be submitted electronically. Upon receipt of the submittal schedule, the Engineer reserves the right to indicate submittals that will not be accepted electronically. Paper copies of such submittals shall be furnished as referenced in this specification.
2. The Engineer reserves the right to require paper copies of submittals that are received electronically. Provide Engineer one (1) paper copies in addition to the electronic submittal. Paper copy will be retained and electronic copy will be returned. Review cycle for such submittals shall not commence until such time that the paper copies are received.

3. Electronic Submittals shall be submitted in Protected Document Format (PDF) compatible with Bluebeam version 12 or later. Electronic files shall not be broken into smaller individual files. File sizes too large to process email or within a file transfer protocol (FTP) site shall be provided on a CD.
4. The submission of submittals electronically does not relieve the contractor of their responsibility to review the submittal prior to transmission to the Engineer. Electronic Submittals shall include contractor comments, and a statement and/or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in this Section and Division 1 have been complied with. Electronic submittals without the Contractor's approval will be rejected and returned.
5. The Engineer assumes no responsibility for the printed reproduction of submittals reviewed electronically, transmission errors or returned electronic submittals that become corrupted or are otherwise not accessible by the Contractor's or Subcontractor's computer hardware and/or software.

I. Product Data:
1. Submit a copy of the fabricator's certificate indicating participation in the PCI Plant Certification Program.
2. Submit producer's or manufacturer's specifications and installation instructions for the proprietary products and bearing materials. Include laboratory test reports and other data to show compliance with specifications (including specified standards).

J. Shop Drawings: Submit shop drawings showing complete information for fabrication and installation of precast concrete units. Reproduction of any portion of the Construction Documents for use as Shop drawings and/or Erection Drawings is prohibited. Shop drawings and/or Erection drawings created from reproduced Construction Documents will be returned without review. Conformance of the Shop Drawings to the Contract Drawings remains the responsibility of the General Contractor. Engineer's review in no way relieves the General Contractor of this responsibility.
1. Indicate member dimensions and cross section
2. Indicate location, size and type of reinforcement, including special reinforcement and lifting devices necessary for handling and erection.
3. Indicate layout, dimensions, and identification of each precast unit corresponding to sequence and procedure of installation. Indicate all openings in units.
4. Indicate welded connections by AWS standard symbols.
5. Detail inserts, connections, and joints, including accessories and construction at openings in precast units.
6. Anchorage: Provide location and details of anchorage devices that are to be embedded in other construction. Furnish templates if required for placement.
7. Openings: Provide size and location of plant cast openings in the plank.
8. Erection Sequencing: Include erection procedure for precast units and sequence of erection.

K. Performance Design: Design Calculations:

1. Provide complete design calculations prepared and stamped and signed by a registered Professional Engineer licensed in the State of Maine.
2. Calculations submitted without affixed stamp and signature will be rejected and returned without review.
3. Balcony Design Criteria:
   a. Design Loads: As indicated on the drawings
   b. Code: Comply with ACI 318, Latest Edition
   c. Maximum Superimposed Live Load Deflection:

      Balconies: Span/480

   d. Camber: Indicate camber in design calculations. See installation tolerances for additional information on anticipated camber.

L. Certificate of Compliance: At completion of fabrication, the precast plank fabricator shall submit a Certificate of Compliance stating that the work was performed in accordance with the construction documents.

M. Plant Concrete Mix Design:
   1. Trial Batch Method: Submit laboratory test reports for concrete materials and mix design tests.
   2. Field Experience Method: Submit required records of strength tests.

N. Field Grout Mix Design: Minimum Strength 4,000 psi. Submit all laboratory test reports and materials. Prepare mixes by the field experience method and/or trial mixtures per the requirements of chapter 5 of ACI 318. Include calculation of average strength and standard devotion.

1.06 DELIVERY, STORAGE AND HANDLING:

A. Deliver precast concrete units, accessories and bearing materials to project site in such quantities and as such times to assure continuity of installation. Coordinate deliver with Structural Steel erection. Store units on appropriate dunnage at project site to prevent cracking, distortion, staining, or other physical damage, and so that markings are visible. Lift and support units at designated lift points.

B. Deliver anchorage items which are to be embedded in other construction before start of such work. Provide setting diagrams, templates, instructions and directions as required for installation.

PART 2 PRODUCTS:

2.01 FORMWORK

A. Provide forms and, where required, form facing materials of metal, plastic, wood, or other acceptable material that is non-reactive with concrete and will produce required finish surfaces.

B. Accurately construct forms, mortar-tight, of sufficient strength to withstand pressures due to concrete placing operations, temperature changes, and when prestressed, pretensioning and detensioning operations. Maintain formwork to provide completed precast concrete units of shapes, lines, and dimensions indicated, within fabrication tolerances specified in the PCI manual referenced above.

C. Unless forms for plant manufactured prestressed concrete units are stripped prior to detensioning, design forms so that stresses are not induced in precast units due to deformation of concrete under prestress or to movement during detensioning.

2.02 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A 615, Grade 60, unless otherwise indicated.

B. Tendons:

1. Uncoated, 7 wire stress relieved strand complying with ASTM A 416. Use grade 250 unless Grade 270 is required by design and has been indicated on shop drawings.
2. Strand similar to the above, but having the size and ultimate strength of wires increased so that the ultimate strength of the strand is increased approximately 15%, or strand with increased strength but with fewer number of wires per strand, may be used at the manufacturer's option.

C. Steel Wire: ASTM A 82, plain, cold-drawn, steel.

D. Welded Wire Fabric: ASTM A 185.

E. Deformed Welded Wire Fabric: ASTM A 497.

F. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing, complying with CRSI recommendations.

2.03 CONCRETE AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type III: Use only one brand and type of cement throughout project, unless otherwise acceptable to Architect.

B. Aggregates: ASTM C 33, and as herein specified. Provide aggregates from a single source. Local aggregates not complying with ASTM C 33, but which have shown by special test or actual service to produce concrete of adequate strength and durability, may be used when acceptable to Engineer.

C. Water: Potable and free from foreign materials in amounts harmful to concrete and embedded steel.

D. Air-Entraining Admixture: Not Required.

E. Water-Reducing Admixture: ASTM C 494, Type A. Types B, C, D or E may be used, subject to the Architect's approval.

F. Calcium Cloride, chloride ions or other salts are not permitted.

G. Cement Grout: Portland cement, ASTM C 150, Type 1, and clean, natural sand, ASTM C 404. Maximum ratio of 3.0 parts sand to 1.0 part cement, by volume, or as required to attain specified strength. Grout mix requires verification indicated in Submittals section.

2.04 RELATED MATERIALS

A. Steel Shapes: ASTM A 36.

B. Bearing Pads: Provide bearing pads for precast hollow slab units in accordance with manufacturer's recommendations and as indicated. Bearing pads shall not stain or leach to adjacent construction.

1. Plastic: Multi-monomer plastic strips, non leaching, and shall support construction loads with no visible overall expansion. Korolath or equal reviewed by Architect.
2. Frictionless Pads: Terrafluorethylene (TFE), with glass fiber reinforcing as required for service load bearing stress.
3. Tempered Hardboard Pads: PS 58, smooth both sides.

C. Accessories: Provide clips, hangers, weld plates, embedded items, anchor rods and other accessories required for installation of project units and for supports of subsequent construction or finishes.

2.05 PROPORTIONING AND DESIGN OF MIXES:

A. Prepare design mixes for each type of concrete required.

B. Design mixes may be prepared by independent testing facility or by qualified precast manufacturing plant personnel, at precast manufacturer's option.

C. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. Use material, including all admixtures, proposed for use on the project.

D. Produce standard-weight concrete consisting of specified portland cement, aggregates, admixtures, and water to produce the following properties:

1. Compressive strength: 5,000 psi minimum at 28 days.
2. Release strength for prestressed units: 3,500 psi minimum or per PCI requirements (which ever is more stringent).

E. Cure compression test cylinders using same methods as used for precast concrete work.

F. Admixtures:

1. Use water-reducing admixtures in strict compliance with manufacturer's directions. Admixtures to increase cement dispersion, or provide increased workability for low-slump concrete, may be used subject to Architect's acceptance.
2. Use amount as recommended by admixture manufacturer for conditions prevailing at time of placing. Adjust quantities of admixtures as required to maintain quality control.

2.06 FABRICATION:

A. General: Fabricate precast concrete units complying with manufacturing and testing procedures, quality control recommendations, and dimensional tolerances of the PCI Manual referenced above and as specified for types of units required.

B. Plant-Mix Concrete: Comply with requirements of ASTM C 94, and as modified below:

1. Delete references for allowing additional water to be added to batch for material with insufficient slump. Addition of water to batch will not be permitted.

C. Built-in Anchorages: Accurately position built-in anchorage devices and secure to formwork. Locate anchorage where they do not affect position of main reinforcement or placing of concrete. Do not relocate bearing plates in units unless acceptable to Architect.

D. Holes and Openings: Cast holes and/or openings in accordance with final shop drawings.

E. Form Coating: Coat surfaces of forms with bond breaking compound before reinforcement is placed. Provide commercial formulation form-coating compounds that will not bound with, stain nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces requiring bond or adhesion. Apply in compliance with manufacturer's instructions.

F. Surface Preparation: Clean reinforcement of loose rust and mill scale, earth and other materials which reduce or destroy bond with concrete.

G. Reinforcement:

1. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations.
2. Locate and support reinforcing with chairs, runners, bolsters, spacers and hangers, as required.
3. Place reinforcement to obtain the specified coverages for concrete protection.
4. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations.
5. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

H. Tendon Pretensioning: Pretensioning of tendons for prestressed concrete may be accomplished either by single strand tensioning method or multiple-strand tensioning method. Comply with PCI MNL-116 requirements.

I. Concrete Placement: Place concrete in a continuous operation to prevent formation of seams or planes of weakness in precast units, complying with requirements of ACI 304. Thoroughly consolidate placed concrete by internal and external vibration without dislocation or damage to reinforcement and built-in items.

J. Balcony Surface Finish:

1. Bottom (ceiling) and edge finish: Provide a smooth finish, clean of debris, honey combining, imperfections, oils and other foreign materials. Chamfer all edges and provide drip edge at underside.
2. Top Finish: Provide a broom finish (form liner) with grooves orientated away from building to promote drainage. Provide camfered edges and smooth finish transition strip.

K. Identification: Provide permanent markings to identify pick-up points and orientation in structure, complying with markings indicated on final shop drawings. Imprint date of casting on each precast unit on a surface which will not show in finished structure.

L. Concrete Curing: Curing by low-pressure steam, steam vapor, radiant heat and moisture, or other similar process may be employed to accelerate concrete hardening and to reduce curing time.

M. Detensioning: Delay detensioning of prestressed units until concrete has attained at least 70% of design stress or per PCI requirements, as established by test cylinders.

1. If concrete has been heat-cured, perform detensioning while concrete is still warm and moist, to avoid dimensional changes which may cause cracking or undesirable stresses in concrete.
2. Detensioning of pretensioned tendons may be accomplished either by gradual release of tensioning jacks or by heat cutting tendons, using a sequence and pattern to prevent shock or unbalanced loading.

N. Adequately reinforce slab units to resist transporting and handling stresses.

PART 3EXECUTION

3.01 INSTALLATION

A. Bearing Pads: Install bearing pads where indicated, as precast units are being erected. Set pads on level, uniform bearing surfaces and maintain in correct position until precast units are placed.

B. Welding:

1. Perform welding in compliance with AWS D 1.1, including qualification of welders.
2. Protect units from damage by field welding or cutting operations and provide noncombustible shield as required.

C. Damaged Coated Surfaces: Repair damaged coating surfaces by cleaning and applying a coat of liquid galvanizing repair compound to galvanized surfaces and compatible primer and paint to painted surfaces.

D. Powder-Actuated Fasteners and Field Installed Mechanical Fasteners: Powder-actuated fasteners and field installed mechanical fasteners may be used for surface (top or bottom) attachment of accessory items in precast, prestressed unit. Precast manufacturer shall provide guidance documentation to Contractor indicating special instructions for the use of these fasteners in the field.

E. Installation Tolerances:
   1. Tolerances shall be verified at time of erection, and prior to joint grouting or attachment of permanent connections.
   2. Replacement or correction of structural precast members, fabricated and supplied out of tolerance shall be the responsibility of the Fabricator, and at the Fabricator's expense in a manner that shall not inhibit the progress of the project.
   3. Tolerances not indicated within shall comply with PCI's "Tolerance Manual for Precast and Prestressed Concrete Construction", MNL-135.
   4. Install precast units without exceeding following tolerance limits at time of or following erection:
      a. Camber (if required by design): Deviation from theoretical level line at supports (positive indicates upward camber) :

         Maximum Camber: 1" or the span length divided by 360 (least value applies)

         Minimum Camber: -1/4"
      b. Variations from Level or Elevation: 1/4" in any 20' run; 1/2" in any 40' run; total plus or minus 1/2" at any location.
      c. Variation from Position in Plan: Plus or minus 1/4" maximum at any location.
      d. Offsets in alignment of Adjacent Members at Any Joint: 1/16" in any 10' run; 1/4" maximum.

F. Temporary Shoring and Bracing: This is the sole responsibility of the Contractor. Provide temporary shoring and bracing members with connections of sufficient strength to support imposed construction loads. Contractor shall provide all shoring necessary to erect precast plank on steel supporting structure. Contractor shall employ the services of a Specialty Engineer Registered in the State of Maine to design such shoring. Shoring design shall account for all construction loads, unbalanced loading, torsional loading and temporary lateral effects on the steel frame and precast concrete elements. The design shall account for all loadings until such time that the construction is completed. Comply with OSHA Standard referenced previous.

G. Grouting Connections: After precast concrete units have been placed and secured, grout open spaces as follows:
   1. Provide forms or other acceptable method to retain grout in place until sufficiently hard to support itself.
   2. Pack spaces with grout material consolidating until voids are completely filled.
   3. Place grout to finish smooth, plumb, and level with adjacent concrete surfaces.
   4. Keep grouted joints damp and warm for not less than 7 days after initial set.

5. Promptly remove grout material from exposed surfaces before it hardens.
6. Grout shall attain the specified 28-day strength prior to application superimposed loads including topping for the Girder Slab System.

3.02 PLANT QUALITY CONTROL EVALUATIONS DURING FABRICATION:

A. Fabricator Requirements:

1. Fabricator is responsible to provide testing to indicate compliance of plank materials and tensioning stresses with manufacturing requirements. Any plank not meeting the requirements of manufacturer shall be repaired or replaced at no cost to the Owner.
2. Fabricator must be an active producer member of the Prestressed Concrete Institute (PCI) and participate in its Plant Certification Program.

B. The Owner reserves the option to employ a separate testing laboratory to evaluate precast manufacturer's quality control and testing methods.

1. The precast manufacturer shall allow Owner's testing facility access to materials storage areas, concrete production equipment, and concrete placement and curing facilities. Cooperate with Owner's testing laboratory and provide samples of materials and concrete mixes as may be requested for additional testing and evaluation.
2. Dimensional Tolerances: Units having dimensions smaller or greater than required, and outside specified tolerance limits will be subject to additional testing as herein specified.
3. Precast units having dimensions greater than required will be rejected if appearance or function of the structure is adversely affected, or if larger dimensions interfere with other construction. Repair or remove and replace rejected units as required to meet construction conditions.
4. Strength of Units: The strength of precast concrete units will be considered potentially deficient if the manufacturing processes fail to comply with any of the requirements which may affect the strength of the precast units, including the following conditions:
5. Failure to meet compressive strength tests requirements.
6. Reinforcement, and pretensioning and detensioning of tendons of prestressed concrete, not conforming to specified fabrication requirements.
7. Concrete curing, and protection of precast units against extremes in temperature, not as specified.
8. Precast units damaged during handling and erection.
9. Testing Precast Units: When there is evidence that strength of precast concrete units does not meet specification requirements, the concrete testing service shall take cores drilled from hardened concrete for compressive strength determination, complying with ASTM C 42 and as follows:
   a. Take at least 3 representative cores from precast units of suspect strength, from locations directed by Architect.
   b. Test cores in a saturated-surface-dry condition per ACI 318 if concrete will be wet during use of completed structure.
   c. Test cores in an air-dry condition per ACI 318 if concrete will be dry during use of completed structure.

d. Strength of concrete for each series of cores will be considered satisfactory if their average compressive strength is at least 85% of 28-day design compressive strength.

e. Test results will be made in writing on same day that test is made, with copies to Architect, Contractor, and precast manufacturer. Include in test reports the project identification name and number, date, name of precast concrete manufacturer, name of concrete testing service, identification letter, name, and type of member or members represented by core tests, design compressive strength compression breaking strength and type of break (corrected for length-diameter ratio), direction of applied load to core with respect to horizontal plan of concrete as placed, and moisture condition of core at time of bearing.

10. Patching: Where core test results are satisfactory and precast units are acceptable for use in work, fill core holes solid with patching mortar, and finish to match adjacent concrete surfaces.

11. Defective Work: Precast concrete units which do not conform to specified requirements, including strength, tolerance, and finishes, shall be replaced with precast concrete units that meet requirements of this section. Contractor shall also be responsible for cost of corrections to other work affected by or resulting from corrections to precast concrete work.

3.03 FIELD QUALITY CONTROL TESTING DURING CONSTRUCTION:

A. The Owner shall employ a Testing Laboratory to inspect, sample and test the materials and the production of grout and to submit test reports. Testing shall be performed by technicians certified by the Maine Concrete Technician Certification Board and/or ACI Concrete Field Testing Technician Grade I

B. Grout shall be sampled and tested for quality control during placement. Quality control testing shall include the following, unless otherwise directed by the Architect.

C. See Submittals section for report requirements.

D. Sample fresh Grout: ASTM C-172, except modified slump to comply with ASTM C-94

E. Slump: ASTM C-143: One test for each grout load at point of discharge and one test for each set of compressive strength specimens.

F. Air Content: ASTM C-173: volumetric method or ASTM C-231 pressure method, one for each set of compressive strength specimens.

G. Temperature: For each load, at time of arrival at point of discharge.

H. Compression Test Specimens: ASTM C-31: one set of four cylinders. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.

I. Compressive Strength Tests: ASTM C39; one set for each 5 cu. yds. or fraction thereof, of grout placed in any one day or for each 4,000 sq. ft. of surface area placed; 1 specimen tested at 7 days, 2 specimens tested at 28 days, 1 specimen retained in reserve for later testing if required.

J. Refer to Section 03 30 00, “Cast-in-Place Concrete” for additional requirements. Substitute therein the word “grout” for the word “concrete.

END OF SECTION

SECTION 05 12 00

STRUCTURAL STEEL

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. The drawings and general conditions of the contract including General and Supplementary Conditions and other Division 1 Specification sections apply to work of this section.

B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.

C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.02 DESCRIPTION OF WORK:

A. Extent of structural steel work is shown on drawings, including schedules, notes and details to show size and location of members, typical connections, and type of steel required.

B. Structural steel is that work defined in AISC "Code of Standard Practice" and as otherwise shown on drawings.

1.03 RELATED WORK

1. Section 05 30 00 – Metal Deck
2. Section 05 50 00 - Metal Fabrications

1.04 QUALITY ASSURANCE:

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

1. AISC "Code of Standard Practice for Steel Buildings and Bridges", Latest Edition.
    a. The provisions of Section 10, "Architecturally Exposed Structural Steel", apply to exposed steel elements for this project. In addition, exposed welds shall be ground to provide smooth surface.
    b. Exclude the word "structural" in reference to the "Design Drawings" in section 3.1 of the Code.
2. AISC "Specification for Structural Steel Buildings", including "Commentary" and Supplements issued thereto.
3. AISC "*Specifications for Structural Joints using ASTM A 325 or A 490 Bolts"* approved by the Research Council on Structural Connections of the Engineering Foundation.
4. AISC 341, "Seismic Provisions for Steel Buildings".
5. AWS D1.1 - "Structural Welding Code" - Steel.
6. AWS D1.3 - "Structural Welding Code" - Sheet Steel.
7. ASTM A6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use."

8. "Code of Federal Regulations, Part 1926" per the Occupational Safety and Health Administration (OSHA), Department of Labor (Latest Revision).

B. Qualifications for Welding Work: Qualify welding processes and welding operators in accordance with AWS D1.1 "Standard Qualification Procedure."

1. Provide certification that welders to be employed in work have satisfactorily passed AWS D1.1 qualification tests and maintained a current certification. Current certification and/or continuity log shall be submitted and be available in the field.
2. If re-certification of welders is required, retesting will be the Contractor's responsibility.

C. Fabricator Qualifications: Fabricator must be a member of the American Institute of Steel Construction (AISC), be certified for SBD – Conventional Steel Building Structures, STD – Standard for Steel Building Structures. Fabricator shall be certified at time of bidding and for duration of project.

1.05 SUBMITTALS

A. Unless otherwise specified, submittals required in this section shall be submitted for review. Submittals shall be prepared and submitted in accordance with this section and Division 1.

B. General Contractor shall submit a Submittal Schedule to the engineer within 30 days after they have received the Owner's Notice to Proceed.

C. All submittals shall be reviewed and returned to the Architect within 10 working days.

D. INCOMPLETE SUBMITTALS WILL NOT BE REVIEWED.

E. Submittals not reviewed by the General Contractor prior to submission to the Engineer will not be reviewed. Include on the submittal statement or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in Division 1 have been complied with.

F. Engineer will review submittals a maximum of two review cycles as part of their normal services. If submittals are incomplete or otherwise unacceptable and re-submitted, General Contractor shall compensate Engineer for additional review cycles.

G. Hardcopy Submittals: Submit three prints. Prints will be reviewed by the Engineer, and then the Architect. One marked print will be returned to Contractor for printing and distribution. Multiple copies will not be marked by the Engineer.

H. Electronic Submittals:

1. Contractor shall include in the submittal schedule an indication of submittals that are intended to be submitted electronically. Upon receipt of the submittal schedule, the Engineer reserves the right to indicate submittals that will not be accepted electronically. Paper copies of such submittals shall be furnished as referenced in this specification.
2. The Engineer reserves the right to require paper copies of submittals that are received electronically. Provide Engineer one (1) paper copies in addition to the electronic submittal. Paper copy will be retained and electronic copy will be returned. Review cycle for such submittals shall not commence until such time that the paper copies are received.

3. Electronic Submittals shall be submitted in Protected Document Format (PDF) compatible with Bluebeam version 12 or later. Electronic files shall not be broken into smaller individual files. File sizes too large to process email or within a file transfer protocol (FTP) site shall be provided on a CD.
4. The submission of submittals electronically does not relieve the contractor of their responsibility to review the submittal prior to transmission to the Engineer. Electronic Submittals shall include contractor comments, and a statement and/or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in this Section and Division 1 have been complied with. Electronic submittals without the Contractor's approval will be rejected and returned.
5. The Engineer assumes no responsibility for the printed reproduction of submittals reviewed electronically, transmission errors or returned electronic submittals that become corrupted or are otherwise not accessible by the Contractor's or Subcontractor's computer hardware and/or software.

I. Product Data: Submit producer's or manufacturer's specifications and installation instructions for the following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).
   1. Structural steel certified mill reports for each grade of steel covering chemical and physical properties and yield strengths.
   2. High-strength bolts (each type), including nuts and washers.
   3. Structural steel primer paint (where applicable).
   4. Structural steel top coat paint (where applicable). (Refer to Division 9).
   5. AWS D1.1 Welder certifications.
   6. Expansion/Adhesive Anchors (coordinate with section 03 30 00).

J. Fabricator's Quality Control Procedures: Fabricator shall submit their written procedural and quality control manuals, and evidence of periodic auditing of fabrication practices by an approved inspection Agency.

K. Fabricator's Certificate of Compliance: At completion of fabrication, fabricator shall submit a certificate of compliance stating that the work was performed in accordance with the construction documents.

L. Shop Drawings:
   1. Shop Drawing Review: Electronic files of structural drawings will not be provided to the contractor for preparation of shop drawings. Reproduction of any portion of the Construction Documents for use as Shop drawings and/or Erection Drawings is prohibited. Shop drawings and/or Erection drawings created from reproduced Construction Documents will be returned without review.
      a. Review of the shop drawings will be made for the size and arrangement of the members and strength of the connections. Conformance of the Shop Drawings to the Contract Drawings remains the responsibility of the General Contractor. Engineer's review in no way relieves the General Contractor of this responsibility.

b. Shop drawings will not be reviewed as partial submittals. A complete submittal shall be provided and shall include; erection and piece drawings indicating all members, braced frames, moment frames and connections. Incomplete submittals will not be reviewed.

2. Connection Design: Submit design calculations prepared and stamped by a Professional Engineer registered in the State of Maine for all beam and column connections not tabulated in the AISC "Manual of Steel Construction" (ASD or LRFD). Submit design for all building braced frames and moment frames where applicable, as indicated on design drawings. Connection designs shall be submitted prior to or with the Shop Drawing Submittal.

   a. Fabricator and Erector are responsible to provide connections that meet the requirements of AISC standards. All shop and field welds, bolts, plates and miscellaneous components required to provide complete connection assemblies shall be provided.

   b. Unless indicated otherwise, simple shear connections shall be provided for the full uniform load capacity of the beam for non-composite construction, and 1.5 times the full uniform load capacity of the beam for composite construction. All connections shall have a minimum of 2 bolts rows in the line of force, and no connection capacity shall be less than 10 kips (unfactored). A tabulation of the simple shear connections shall be provided with the connection submittal.

   c. Braced frame connections: A brace force has been provided on the drawings.

   d. Braced frame connections shall be designed utilizing the Uniform Force Method, with a connection geometry that does not induce a moment on the connected beam or column.

   e. To the greatest extent possible and where required herewithin, welds shall be designed and detailed to be installed downhand.

   f. Column splices shall be designed and detailed per AISC standards. An uplift force has been provided on the drawings for column splices at braced frames.

   g. Moment connections: Design moments have been provided on the drawings for moment connections not otherwise specified. Moment connections not specified, that are part of the lateral resisting system, shall be designed for the full moment capacity of the beam or per the requirements of AISC 341 "Seismic Provisions", Latest Edition (whichever requirement is more stringent). Where permitted, bolted moment connections shall not reduce the flange area of the beam by more than 15 percent.

3. Test Reports: Submit copies of reports of tests conducted on shop and field bolted and welded connections. Include data on type(s) of test conducted and test results.

1.06 DELIVERY, STORAGE AND HANDLING:

A. Deliver materials to site at such intervals to insure uninterrupted progress of work.

B. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place, in ample time to not delay work.

C. Store materials to permit easy access for inspection and identification. Keep steel members off ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.

D. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Steel materials shall be stored in a manner to avoid ponding of precipitation on members. Repair or replace damaged materials or structures as directed.

PART 2 PRODUCTS

2.01 MATERIALS:

A. Structural Steel Shapes, Plates and Bars (U.N.O): ASTM A 36 minimum, higher strength steel is acceptable.

B. Structural Steel Hot Rolled Wide Flange Shapes: ASTM A 992 Grade 50 (ASTM A572 Grade 50 with special requirements per AISC Technical Bulletin #3, dated March 1997)

C. Steel Tube: ASTM A 500, Grade B, Fy = 46 ksi.

D. Steel Pipe: ASTM A 53, Grade B.

E. Anchor Bolts: ASTM F1554, Grade 36 weldable steel, unless noted otherwise on drawings. Anchor rods that are to be exposed to weather, located in unheated enclosures, or in contact with pressure treated lumber shall be hot dipped galvanized. All anchor bolts shall be headed or double nutted. "J" or "L" type anchor bolts are not permitted. Unless otherwise noted, specified embedment it to top face of head or nut.

F. Unfinished Threaded Fasteners: ASTM A 307, Grade A, regular low-carbon steel bolts and nuts. Provide hexagonal heads and nuts for all connections.

G. 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 or ASTM A490. Refer to drawings for diameter.
2. Direct tension indicator washers or bolts may be used at Contractor's option.
3. Provide hot-dipped galvanized fasteners at relieving angles.

H. Steel Shear Studs: Headed type manufactured from steel conforming to ASTM A108 Grade C1015 by KSM or Nelson. Refer to Drawings for diameter and length.

I. Deformed Bar Anchors, manufactured by Nelson and attached to structural steel. Refer to drawings for diameter and length.

J. Electrodes for Welding:

1. Minimum 70 ksi electrodes. Filler material shall meet the grouping requirements per AWS D1.1 Table 3.1 for matching strength of connected materials.
2. All filler metal used welding shall meet the following Charpy V-Notch (CVN) requirements.
    a. 20 ft-lb at 0 degrees Fahrenheit unless noted otherwise.
    b. 20 ft-lb at -20 degrees Fahrenheit and 40 ft-lb at 70 degrees

Fahrenheit at all complete joint penetration (CJP) groove welds.

K. Structural Steel Coatings shall be as specified in the Structural Steel Coatings section of this specification, and as specified in Division 9.

L. Steel Coatings for Exterior Exposed Steel: Except where indicated to be primed and painted, Hot Dipped Galvanized per ASTM A123/A123M (latest edition). Galvanizing shall be applied in a manner to provide Class C faying surfaces for slip critical connections. See Structural Steel Coatings section for additional requirements for galvanizing and painting.

M. Non Shrink Cement-Based Grout: See Section 03 30 00

N. Drilled Anchors: Expansion and adhesive by HILTI, SIMPSON or POWERS/RAWL as indicated on the drawings.

2.02 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.

1. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which 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. Provide field bolted connections, except where welded connections or other connections are indicated.
2. Provide high-strength threaded fasteners for principal bolted connections, except where unfinished bolts are indicated.

C. High-Strength Bolted Connection: Install high-strength threaded fasteners in accordance with AISC “Specification for Structural Joints using ASTM A 325 or A 490 Bolts”. Unless otherwise indicated, all bolted connections are to be tightened to the snug tight condition as defined by AISC.

D. Welded Construction: Comply with AWS Codes for procedures, appearance and quality of welds, and methods used in correcting welding work.

E. 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.

F. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.

G. Fabricator, Erector and General Contractor shall coordinate safety requirements for the project, in accordance with OSHA Part 1926. Provide all necessary pieces and fabrications as required to safely erect and access the structure for the duration of project construction.

H. Camber, if any, is indicated on the drawings. Camber indicated is the required camber at time of erection. Contractor shall survey camber prior to placing metal deck.

2.03 STRUCTURAL STEEL COATINGS

A. Coordinate coating requirements with the Architect, and with Division 9 of the specifications.

B. To the greatest extent possible, structural steel coatings shall be shop applied.

C. Coordinate steel markings with coating system to eliminate “bleed through” on steel permanently exposed to view.

D. Galvanizing, priming and painting for structural steel permanently exposed to view shall meet the requirements of Section 10 of the Code of Standard Practice, “Architecturally Exposed Structural Steel”.

E. Provide venting/drainage holes in closed tubular members to be hot-dipped galvanized. Holes shall be provided in a location hidden from view in the final condition and in a manner that will not reduce the strength of the member. Hole locations shall be clearly indicated on the Shop Drawings and are subject to review by the Architect.

F. Follow manufacturer’s installation and safety instructions when applying coatings. Adhere to recoat time recommendations set forth by manufacturer.

G. General: Shop priming of structural steel is not required for heated, interior steel not exposed to view unless noted otherwise.

H. Steel which is to receive spray-on fireproofing shall not to be primed or painted, unless specified by the Architect.

I. Coatings: All exterior steel and/or steel permanently exposed to view shall receive a coating. Unless noted otherwise, refer to Division 9 specifications for products and surface preparation requirements.

J. Brick masonry loose lintels and relieving angle assemblies, including fasteners, shall be hot dipped galvanized, unless noted otherwise on the Architectural Drawings. Complete all shop fabrication prior to galvanizing assemblies.

K. Unheated structural steel to be enclosed with architectural finishes, including but not by limitation, canopy members and/or roof pop-up members shall be primed with rust inhibitive alkyd primer, Tnemec Series 10 unless noted otherwise. Follow manufacturer’s instructions for surface preparation and application. Substitution shall be equal to the above specified products, and shall be submitted for review.

L. Steel Embedded in Concrete/Below Grade: Steel which is embedded in concrete, below grade/slab level, or as otherwise indicated on the drawings, shall be field painted with cold-applied asphalt emulsion complying with ASTM D 1187. Paint embedded areas only. Do not paint surfaces which are to be welded until welding is complete.

M. Field Touch-up: Touch-up all paint and galvanizing damage, including but not by limitation, damage caused during shipping, erection, construction damage, and field welded steel. See Division 9 specifications for additional requirements.

PART 3 EXECUTION

3.01 ERECTION:

A. General: Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.

B. Erection Procedures: Comply with “Code of Federal Regulations, Part 1926” per the Occupational Safety and Health Administration (OSHA), Department of Labor (Latest Revision).

C. Surveys: Employ a Registered Land Surveyor to verify elevations of concrete bearing surfaces, and locations of anchor bolts and similar devices, before erection work proceeds, and report discrepancies to Architect and Structural Engineer. Do not proceed with erection until corrections have been made, or until compensating adjustments to structural steel work have been approved by Structural Engineer of Record. Additional surveys required to verify out-of-alignment work and/or corrective work shall be performed at the contractor's expense.

D. Temporary Shoring and Bracing: This is the sole responsibility of the Contractor. Provide temporary shoring and bracing members with connections of sufficient strength to support imposed loads. Remove temporary members and connections when all permanent members are in place, and all final connections are made, including the floor and roof diaphragms. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds. Comply with OSHA Standard referenced previous. Retain the services of a Specialty Structural Engineer (Not the Engineer of Record) to design specialty shoring and bracing.

E. Anchor Bolts: Furnish anchor bolts and other connectors required for securing structural steel to foundations and other in-place work.

1. 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.
2. Welding to anchor bolts for corrective measures is strictly prohibited without prior written approval from the Engineer.

F. Setting Plates and Base Plates:

1. Furnish templates and other devices as necessary for presetting bolts and other anchors to accurate locations. Refer to division 3 of the project Specifications for anchor bolt installation requirements in concrete.
2. Clean concrete bearing surfaces of bond-reducing materials. Clean bottom surface of setting and bearing plates.
3. Set loose and attached base plates for structural members on wedges or other adjusting devices.
4. Pack non-shrink 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. For proprietary grout materials, comply with manufacturer's instructions.

G. Concrete slabs that are part of elevated floors framing systems shall achieve 28-day design strength prior to the application of any superimposed loads such as curtain walls, masonry veneer, mechanical equipment and stairs. Additional testing beyond that specified in division 3 required to verify the concrete strength prior to application of superimposed loads shall be done at the Contractor's expense.

H. When installing expansion bolts or adhesive anchors, the contractor shall take measures to avoid drilling or cutting any existing reinforcement or damaging adjacent concrete. Holes shall be blown clean with compressed air and/or cleaned per manufacturer's recommendations prior to the installation of anchors.

I. Field Assembly:

1. Set structural frames accurately to lines and elevations indicated.

2. Align, adjust, level and plumb members of complete frame in to the tolerances indicated in the AISC Code of Standard Practice and in accordance with OSHA regulations.
3. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly.
4. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
5. Splice members only where indicated and accepted on shop drawings.
6. Do not enlarge unfair holes in members by burning or by use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.
7. Composite shear studs / deformed bar anchors shall be installed using stud welding process with an appropriately sized insulating ferrule. Fillet welding of shear studs is not permitted. Ferrules shall be broken free from the shear studs and removed from the deck surface along with all other debris.

J. Tolerances: Erection tolerances shall meet the “Code of Standard Practice” except as noted. Cumulative tolerances of framing elements shall not exceed the available tolerances of façade support systems to ensure and provide a plumb façade face.

K. Coat columns, base plates, and brace elements encased in concrete and/or below grade with cold-applied asphalt emulsion. Coordinate coating with concrete work.

L. Erection bolts: Remove erection bolts. On exposed welded construction and at all braced frame members fill holes with plug welds and grind smooth at exposed surface.

M. 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 which are not under stress, as accepted by the Engineer of Record. Finish gas-cut sections equal to a sheared appearance when permitted.

N. Coating Damage: Touch up shop applied paint or galvanizing whenever damaged or bare. See “Coatings” sections for additional requirements.

O. Field Cut Beam Web Penetrations:
1. Field cut beam web penetrations are not permitted without written approval from the Structural Engineer.
2. Gas cutting torches are not permissible for cutting beam web penetrations without written approval from the Structural Engineer.
3. Beams with field cut beam web penetrations may require reinforcement, subject to the evaluation by the Structural Engineer.
4. The evaluation of field cut web penetrations by the Structural Engineers for Design-Build Subcontractors, including but not by limitation, Mechanical, Electrical, Plumbing and Sprinkler Subcontractors shall be compensated by the General Contractor or Design-Build Subcontractor.
5. The cost of executing field cut web penetrations and the associated beam reinforcement for Design-Build Subcontractors, including but not by limitation, Mechanical, Electrical, Plumbing and Sprinkler Subcontractors shall be paid for by the General Contractor or Design-Build Subcontractor.

6. Field cut beam web penetrations may not be permitted in certain locations, subject to the evaluation by the Structural Engineer.

P. Welders shall have current evidence of passing and maintaining the AWS D1.1 Qualifications test available in the field.

Q. Welding electrodes, welding process, minimum preheat and interpass temperatures shall be in accordance with AISC and AWS specifications. Any structural steel damaged in welding shall be replaced.

R. Field Welded Moment Connections:

1. Backing materials for top and bottom flanges for field welded moment connections shall be removed, backgouge the weld root, and apply a reinforcing fillet weld.

2. Where top flange steel backing materials are utilized, the backing may be left in place. In this case, the backing material shall be welded with a reinforcing fillet weld.

3.02 QUALITY CONTROL:

A. General: Contractor is responsible for maintaining quality control in the field and for providing a structure that is in strict compliance with the Contract Documents.

1. Required inspection and testing services are intended to assist the Contractor in complying with the Contract Documents. These specified services, however, do not relieve the Contractor of his responsibility for compliance, nor are they intended to limit the Contractor's quality control efforts in the field.

B. Testing: Owner shall engage an Independent Testing Agency to inspect all high-strength bolted and welded connections, to perform tests and prepare reports of their findings. All connections must pass these inspections prior to the installation of subsequent work which they support.

1. Testing agency shall conduct tests and state in each report which specific connections were examined or tested, whether the connections comply with requirements, and specifically state any deviations therefrom.

2. Contractor shall provide access for testing agency to places where structural steel work is being fabricated, produced or erected so that required inspection and testing can be accomplished. Testing agency may inspect structural steel at plant before shipment. The Engineer, however, reserves the right, at any time before final acceptance, to reject material not complying with specified requirements.

C. Inspection Requirements (to be performed by the Independent Testing Agency):

1. Bolted Connections: Inspect all bolted connections in accordance with procedures outlined in the AISC "Specification for Structural Joints using ASTM A325 or A490 Bolts.

2. Snug Tight Bolted Connections:

a. The inspector shall monitor the installation of bolts to determine that all plies of connected material have been drawn together and that the selected procedure is used to tighten all bolts.

b. If the inspector does not monitor the installation of bolts, he shall visually inspect the connection to determine that all plies of connected material have been drawn together and conduct tests on a sampling connection bolts to determine if they have been

tightened to the snug tight condition. The test sample shall consist of 10% of the bolts in the connection, but not less than two bolts, selected at random. If more than 10% of the tested bolts fail the initial inspection, the engineer reserves the right to increase the number of bolts tested.

3. Slip Critical Bolted Connections:
    a. The inspector shall monitor the calibration of torquing equipment and the installation of bolts to determine that all plies of connected material have been drawn together and that the selected procedure is used to tighten all bolts.
    b. If the inspector does not monitor the calibration or installation procedures, he shall test all bolts in the affected connection using a manual torque wrench to assure that the required pretension has been reached.
4. Field Welded Connections: inspect and test during fabrication of structural steel assemblies, and during erection of structural steel all welded connections in accordance with procedures outline in AWS D1.1. Record types and location of defects found in work. Record work required and performed to correct deficiencies.
    a. Certify welders and conduct inspections and tests as required. Submit welder certifications to Engineer of Record. Perform visual inspection of all welds. Primary and secondary welds, including fillet welds, full penetration welds, and deck puddle welds, applied in the field and/or shop, shall be visually inspected.
    b. Welds deemed questionable by visual inspection shall receive non-destructive testing. In addition, all partial and full penetration welds, and any other welds indicated on the drawings are to receive non-destructive testing. Non-destructive testing methods include the following:
        1. Radiographic Inspection (RT): ASTM E 94 and ASTM E 142; minimum quality level “2-2T”.
        2. Ultrasonic Inspection (UT): ASTM E 164.
        3. Magnetic Particle (MT) inspection procedures may be utilized at the inspectors discretion in addition to RT or UT inspection. MT procedures shall not replace RT or UT procedures without permission from the Structural Engineer.
    c. All welds deemed unacceptable shall be repaired and retested at the Contractor’s expense.

D. Composite Shear Studs/Deformed Bar Anchors:
1. Verify shear stud quantity and arrangement.
2. Visually inspect stud weld. A weld less than 360 degrees is cause for further testing by bending to 15 degrees per item 2 below. Strike all studs with a 3 pound sledge hammer with moderates force. Studs shall make a ringing sound when struck with the hammer. If a stud or studs breaks free, or fails to make a ringing sound, further testing shall be performed per item 4.
3. One stud in 100 shall be tested by bending to 15 degrees from vertical, and one stud in 200 shall be tested by bending to 30 degrees from vertical.

Single bent studs may be left bent. Failure of stud weld during bend testing is cause for further testing per item 4.

4. When failure occurs during bend testing, additional bend testing shall be performed on 10 studs to either side of failed stud. Bend studs to 30 degrees from vertical. If failure occurs during additional testing, continue testing in series of 10 studs beyond failed stud until no failure occurs.
5. Straighten all studs that were bent in multiple stud testing. Replace all studs that fail.

E. Inspector shall verify that all ferrules are removed when applicable and that metal deck is free of debris prior to concrete placement.

F. Testing and inspection reports shall be submitted to the Owner, Architect and Engineer within 48 hours of completion of each test or inspection.

G. Nonconforming Work: Contractor shall be responsible for correcting deficiencies in structural steel work which inspections laboratory test reports have indicated to be not in compliance with requirements. Additional tests and/or surveys shall be performed, at the Contractor's expense, as may be necessary to show compliance of corrected work. Any costs associated with the Engineer's review and disposition of faulty works shall be borne by the Contractor.

END OF SECTION

SECTION 05 30 00
METAL DECKING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. The drawings and general conditions of the contract including General and Supplementary Conditions and other Division 1 Specification sections apply to work of this section.

B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.

C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.02 DESCRIPTION OF WORK

A. Extent of metal floor and roof deck is shown on the drawings and includes type VL composite floor deck, roof deck, cell closures, end plates, pour stops with vertical leg return lip, metal lath column closures, composite finish strips, welding washers and sump plates or pans.

1.03 RELATED WORK

1. Section 05 12 00 - Structural Steel
2. Section 05 50 00 - Metal Fabrications

1.04 QUALITY STANDARDS

A. Codes and Standards: Comply with provisions of the following codes and standards, except where more stringent requirements are indicated or specified:

1. AISI "Specification for the Design of Cold Formed Steel Structural Members".
2. AWS D1.1 "Structural Welding Code" - Steel
3. AWS D1.3 "Structural Welding Code" - Sheet Steel
4. Steel Deck Institute (SDI) " Design Manual for Floor Decks and Roof Decks".
5. "Code of Federal Regulations, Part 1926" per the Occupational Safety and Health Administration (OSHA), Department of Labor (Latest Revision).

B. Qualification of field welding: Qualify welding process and welding operators in accordance with AWS D1.1 "Standard Qualification Procedure."

1.05 SUBMITTALS

A. Unless otherwise specified, submittals required in this section shall be submitted for review. Submittals shall be prepared and submitted in accordance with this section and Division 1.

B. General Contractor shall submit a Submittal Schedule to the engineer within 30 days after they have received the Owner's Notice to Proceed.

C. All submittals shall be reviewed and returned to the Architect within 10 working days.

D. Incomplete submittals will not be reviewed.

E. Submittals not reviewed by the General Contractor prior to submission to the Engineer will not be reviewed. Include on the submittal statement or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in Division 1have been complied with.

F. Engineer will review submittals a maximum of two review cycles as part of their normal services. If submittals are incomplete or otherwise unacceptable and re-submitted, General Contractor shall compensate Engineer for additional review cycles.

G. Hardcopy Submittals: Submit three prints. Prints will be reviewed by the Engineer, and then the Architect. One marked print will be returned to Contractor for printing and distribution. Multiple copies will not be marked by the Engineer.

H. Electronic Submittals:

1. Contractor shall include in the submittal schedule an indication of submittals that are intended to be submitted electronically. Upon receipt of the submittal schedule, the Engineer reserves the right to indicate submittals that will not be accepted electronically. Paper copies of such submittals shall be furnished as referenced in this specification.

2. The Engineer reserves the right to require paper copies of submittals that are received electronically. Provide Engineer one (1) paper copies in addition to the electronic submittal. Paper copy will be retained and electronic copy will be returned. Review cycle for such submittals shall not commence until such time that the paper copies are received.

3. Electronic Submittals shall be submitted in Protected Document Format (PDF) compatible with Bluebeam version 12 or later. Electronic files shall not be broken into smaller individual files. File sizes too large to process email or within a file transfer protocol (FTP) site shall be provided on a CD.

4. The submission of submittals electronically does not relieve the contractor of their responsibility to review the submittal prior to transmission to the Engineer. Electronic Submittals shall include contractor comments, and a statement and/or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in this Section and Division 1 have been complied with. Electronic submittals without the Contractor's approval will be rejected and returned.

5. The Engineer assumes no responsibility for the printed reproduction of submittals reviewed electronically, transmission errors or returned electronic submittals that become corrupted or are otherwise not accessible by the Contractor's or Subcontractor's computer hardware and/or software.

I. Product Data: Submit manufacturer's specifications and installation instructions for each type of decking and accessories. Include manufacturer's certification as may be required to show compliance with these specifications.

J. Shop Drawings:

1. Shop Drawing Review: Electronic files of structural drawings **will not** be provided to the contractor for preparation of shop drawings.

a. Submit detailed drawings showing layout and types of deck panels, galvanizing, shop paint, anchorage details, and conditions requiring closure panels, supplementary framing, sump pans, cant strips, cut openings, special jointing, and all other accessories. Conformance of the Shop Drawings to the Contract Drawings remains the responsibility of the General Contractor. Engineer's review in no way relieves the General Contractor of this responsibility.

b. Shop drawings will not be reviewed as partial submittals. A complete submittal shall be provided and shall include; erection and piece drawings. Incomplete submittals will not be reviewed.

1.06 DELIVERY, STORAGE AND HANDLING:

A. Deliver materials to site at such intervals to insure uninterrupted progress of work.

B. Store materials to permit easy access for inspection and identification. Keep deck sheets off ground, using pallets, platforms, or other supports. Protect deck sheets and packaged materials from corrosion and deterioration.

C. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Materials shall be stored in a manner to avoid ponding of precipitation on members. Repair or replace damaged materials or structures as directed.

PART 2 PRODUCTS

2.01 GENERAL:

A. Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

1. United Steel Deck
2. Wheeling Corrugating Co.
3. Epic Metals Corporation
4. Vulcraft

B. Materials:

1. Steel for Metal Deck Units:
    a. Floor Deck Units: ASTM A1008, Grade C, D or ASTM A653, Structural Quality, grade 40 or higher
    b. Roof Deck Units: ASTM A1008, Grade C, D, or E, or ASTM A653, Structural Quality, grade 33 or higher.
2. Miscellaneous Steel Shapes: ASTM A36 minimum.
3. Sheet metal Accessories: ASTM A526, commercial quality, galvanized.

C. Galvanizing: Conform to ASTM 924-94 with minimum coating class of G60 (Z180) as defined in ASTM A653-94.

D. Paint: Manufacturer's baked on, rust inhibitive paint, for application to metal surfaces which have been chemically cleaned and phosphate chemical treated.

E. Flexible closure Strips: Manufacturer standard vulcanized, closed-cell, synthetic rubber.

2.02 FABRICATION:

A. General: Form deck units in lengths to span 3 or more supports, unless otherwise noted on the drawings, with flush, telescoped or nested 2" laps at ends and interlocking or nested side laps, unless otherwise indicated. For roof deck units, provide deck configurations complying with SDI "Roof Deck Specifications," of metal thickness, depth and width as shown.

B. Metal Cover Plates: Fabricate metal cover plates for end-abutting floor deck units of not less than same thickness as decking. Form to match contour of deck units and approximately 6" wide.

C. Metal Closure Strips: Fabricate metal closure strips, cell closures, "Z" closures, column closures, pour stops, girder fillers and openings between decking and other construction, of not less than 0.045" min. (18 gage) sheet steel or as indicated on the drawings. Form to provide tight fitting closures at open ends of cells or flutes and sides of decking.

D. Pour Stops: Minimum material thickness shall be 18 gage or as indicate on drawings.. Fabricate vertical leg to accommodate specified slab thickness. Fabricate horizontal leg to minimize field cuts. Provide welded attachment sufficient to resist forces during concrete placement.

E. Roof Sump Pans: Fabricate from a single piece of 0.071" min. (14 gage) galvanized sheet steel with level bottoms and sloping sides to direct water flow to the drains, unless otherwise shown. Provide sump pans of adequate size to receive roof drains and with bearing flanges not less than 3" wide. Recess pans not less than 1 1/2" below roof deck surface, unless otherwise shown or required by deck configuration. Holes for drains will be cut in the field.

F. Provide all pour stops and accessories necessary to contain concrete for poured concrete surfaces.

PART 3 EXECUTION

3.01 INSTALLATION:

A. Install deck units and accessories in accordance with manufacturer's recommendations and final shop drawings, and as specified herein.

B. Place deck units on supporting steel framework and adjust to final position with ends accurately aligned and bearing on supporting members before permanently fastened. Deck shall be in full contact with members parallel to ribs and attached as indicated. Do not stretch or contact side lap interlocks.

C. Place deck units in straight alignment for entire length of run of cells and with close alignment between cells at ends of abutting units.

D. Place deck units flat and square, secured to adjacent framing without warp or excessive deflection.

E. Coordinate and cooperate with the structural steel erector in locating decking bundles to prevent overloading of structural members.

F. Do not use decking units for storage or working platforms until permanently installed.

3.02 FASTENING:

A. Floor Deck: Fasten metal deck to supporting steel members as indicated on the Design Drawings: Each deck is to be fastened with a minimum of 5/8" diameter puddle welds spaced not more than 12" o.c. with a minimum of 2 welds per unit at each support. Secure deck units at 6” oc along brace lines, edge of building or at the edge of openings or deck discontinuity. Secure deck to each supporting member in ribs where sidelaps occur. Use welding washers where recommended by the deck manufacturer. Deck units shall bear over the ends of supports by a minimum of 1.5. Sidelaps: #10 Tek screws, 5/8” arc puddle welds or 1” long fillet welds, intervals not exceeding 36 inches. Crimped or button punched sidelaps are not permitted.

B. Roof Deck: Each deck is to be fastened with a minimum of 5/8" diameter puddle welds spaced in a 24/4 pattern (3N deck) or 36/7 pattern (1.5B deck) or 24/3 pattern (ER deck) with a minimum of 2 welds per unit at each support if incomplete sheet is utilized. Where support is parallel to support, at edge of building, at brace lines, at edge of opening or deck discontinuity provide puddle welds at 6" o.c. Secure deck to each supporting member in ribs where sidelaps occur. Deck units shall bear over the ends of supports by a minimum of 1.5". Sidelaps: #10 Tek screws, 2 per span for B deck and ER deck, 6 per span for N deck.

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

D. Uplift loading: Floor deck units are not required to resist uplift loads. Decking units used at the roof level shall be designed for a net uplift of 20 psf.

E. Cutting and Fitting: Cut and neatly fit deck units and accessories around other work projecting through or adjacent to the decking.

F. Reinforcement at openings: Provide additional metal reinforcement and closures pieces as required for strength, continuity of decking and support of other work shown.

1. Deck penetrations affecting no more than (1) deck rib need not be reinforced.
2. For deck penetration affecting more than (1) deck rib, but less than 10", reinforce the opening with a 0.057" thick plate spanning between unaffected ribs, unless otherwise shown on the Design Drawings or supporting a piece of mechanical equipment (see item 3).
3. Reinforce deck penetrations larger than 10" with the structural frame described in the Design Drawings.

G. Joint Covers: Provide metal joint covers at abutting ends and changes in direction of floor deck units.

H. Roof Sump Pans: Place over openings provided in roof decking and weld to top decking surface. Space welds not more than 12" on center with at least 1 weld in each corner. Cut opening in roof sump bottom to accommodate drain size indicated.

I. Closure Strips: Provide metal closure strips at open uncovered ends and edges of roof decking, and in voids between decking and other construction. Weld into position to provide a complete decking installation.

J. Touch-Up Painting:

1. Painted Deck: After decking installation, wire brush, clean and paint scarred areas, welds and rust spots on top and bottom surfaces of decking units and supporting steel members.
    a. Touch up painted surfaces with same type paint used on adjacent surfaces.
    b. In areas where shop-painted surfaces are to be exposed, apply touch-up paint to blend into adjacent surfaces.

3.03 QUALITY CONTROL:

A. General: Contractor is responsible for maintaining quality control in the field and for providing a structure that is in strict compliance with the Contract Documents.

B. Required inspection and testing services are intended to assist the Contractor in complying with the Contract Documents. These specified services, however, do not relieve the Contractor of his responsibility for compliance, nor are they intended to limit the Contractor's quality control efforts in the field.

C. Testing: Owner shall engage an Independent Testing Agency to inspect all puddle welded connections, to perform tests and prepare reports of their findings. All connections must pass these inspections prior to the installation of subsequent work which they support.

D. Deck Testing Requirements (to be performed by the Independent Testing Agency):

1. Deck and accessory welding and/or attachments subject to inspection and testing. Work found to be defective will be removed and replaced at the Contractor's expense.

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

END OF SECTION

SECTION 31 23 15
BUILDING PAD EARTHWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Provide all labor, materials, equipment and services, etc. and perform all operations necessary for building pad earthwork required for the execution of all construction as indicated on the Drawings, Specified herein, or otherwise required for a complete and proper job.

B. The building pad area is defined as the building area to ten (10) feet outside of the proposed building footprint, including attached walkways, canopies, sidewalks, loading docks, retaining walls, and any other such appurtenances that are necessary for construction of the building.

C. Only fill material defined herein and in the Geotechnical Engineering Report prepared for the Project by S.W. Cole Engineering titled Proposed Senior Living Facility, The Park Danforth, Arbor Street & Forest Street, Portland Maine shall be used as backfill for all foundation excavations and fill within the building pad as defined above. The required fill material shall extend to the lateral limits defined as 1 foot horizontally and then 1 foot horizontal and 1 vertical line sloped down and outward from the bottom outside edge of foundations and floor slabs supported by fill (Zone of Stress Influence).

D. Subsurface investigations and reports have been executed, and the results are available for the Contractor's general information only. The Architect and Owner assume no responsibility for their completeness, accuracy, or correctness.

E. Excavations shall be undertaken by the Contractor until the naturally occurring undisturbed native sands deposits are encountered at or below the estimated bearing levels. The Geotechnical Engineer shall determine the acceptability of bearing surface and determine requirements for compaction, additional removals and refills.

F. Dewatering may be required. Maintain water levels a minimum of two (2) feet below the lowest excavated depth. Surface water shall be immediately removed from excavations.

1.02 RELATED REQUIREMENTS

A. Section 02 32 10 – Subsurface Explorations.

B. Section 33 46 00 - Subdrainage.

C. Division 31 - Earthwork.

D. Division 32 - Exterior Improvements.

E. Division 33 - Utililities.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide product data on all manufactured products including filter fabric and aggregate products (sieve analysises).

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. If dewatering is required, the Contractor shall submit their proposed dewatering methods to the Geotechnical Engineer at least two (2) weeks prior to implementation.

1.04 TESTING AND INSPECTIONS

A. See Section 01 40 00 – Quality Requirements.

B. Testing Agency Services Provided by the Owner: Testing and inspections shall be performed as required by the building code, the Contract Documents, or as otherwise directed by the Architect. The Owner shall employ a Testing Agency and/or a Geotechnical Engineer for the purpose of testing and inspecting existing site soil conditions, fill materials, fill placement, and load-bearing requirements.

1. Owner's testing and inspection services shall be paid from the Testing Allowance. See Section 01 21 00 - Allowances.

C. The following testing and inspections shall be conducted prior to field compaction:
   1. During and following excavation, the Geotechnical Engineer shall verify the suitability of existing soils, verify design bearing capacity, and promptly notify the Owner, Contractor, and Architect of any variances.
   2. During placement and compaction activities, compliance with the recommendations of the Geotechnical Report for fill materials and maximum lift thickness shall be verified.
   3. At least one week prior to compaction, at least one test shall be made on a representative sample of each borrow material that will be incorporated in compacted earthwork to confirm gradation, per ASTM D422 and moisture density characteristics per ASTM D1557.

D. The following testing and inspections shall be conducted after field compaction to determine the actual in-place densities being attained.
   1. Perform field in-place density tests in accordance with ASTM D2922 (nuclear method).
   2. Verification and approval of footing and slab subgrades shall be performed by the Geotechnical Engineer prior to the placement of any required fill material or foundation forms.
   3. Building slab areas shall be tested at each compacted fill and backfill layer, with at least one in-place density test for every 2,000 sq. ft., but in no case fewer than three (3) tests.
   4. Foundation wall backfill shall be tested at each compacted backfill layer with at least one in-place density test for each 100 feet or less of wall length, but no fewer than two (2) tests along a wall face.

E. When the Testing Agency reports that fills, or backfills are below specified density, corrections shall be made, and all re-tests shall be at the expense of the Contractor.

F. Such inspections and tests shall not relieve the Contractor of responsibility for providing his own inspections, quality control and materials and fabrication procedures in compliance with specified requirements. Any non-compliant materials shall be removed and replaced at the Contractor’s expense.

G. The Contractor shall cooperate with and facilitate testing and inspection by the Testing Agency. The Contractor shall, at his own expense, furnish the Testing Agency, upon request, with the following:
   1. Representative samples for testing.
   2. Assistance for testing materials and proper facilities for inspection of the Work.
   3. Access to the pit for Testing Agency inspection and testing, if required.

H. The Contractor shall arrange and coordinate all testing and inspections and shall give the Testing Agency adequate advance notice.

I. Testing Agency Services Provided by the Contractor: The Contractor shall provide and pay for certification testing, including but not limited to gradation analysis, for all imported fill materials submitted to the Architect for approval.
   1. The Contractor shall notify the Architect at least seven (7) working days in advance of intention to import material.
   2. If materials change in composition from that originally submitted by the Contractor, new gradation tests and moisture/density testing shall be conducted on soil samples. The cost of such re-testing shall be the responsibility of the Contractor.
   3. The Contractor shall re-compact, remove and replace, and re-test, all Work for which test results fail to meet Project requirements at no cost to the Owner.

J. Do not allow or cause any of the Work performed or installed to be covered up or enclosed by Work of this Section prior to all required inspections, tests, and approvals. Should any of the Work be so enclosed or covered up before it has been approved, the Contractor shall uncover all such Work at no additional cost to the Owner. After the Work has been completely tested, inspected and approved, make all repairs and replacements necessary to restore the Work to the condition in which it was found at the time of uncovering, all at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 PRODUCTS

A. Select Granular Fill: Consisting of bank-run sand and gravel, free of organic materials, snow, ice or other unsuitable materials and graded within limits as follows:

Sieve Size:	Percent Passing by Weight:
4 inch	100%
3 inch	90-100%
No. 4	25-90%
No. 40	0-30%
No. 200	0-5

1. Application: For beneath footings and building slabs.

B. On-Site Excavated Soil: These materials may be highly moisture and disturbance sensitive. Reuse as Common Fill outside the building may be possible under warm and dry conditions and will be very difficult, if not impossible in cold, wet weather.
   1. Applications: Landscape areas.

C. Crushed Stone: ¾ inch angular washed stone; Graded Course Aggregates, Standard Stone Size # 67 of the NHDOT Standard Specifications for Road and Bridge Construction, latest edition.
   1. Applications: Foundation perimeter drainage system, locations indicated Drawings, and as indicated herein.

D. Geotextile (Filter Fabric): Six ounce/sq yd minimum, needle-punched, non-woven, synthetic, chemically resistant non-biodegradable fabric. Geotextile shall be used to prevent fine-grained soils from migrating into coarse grain materials as judged necessary by the Engineer, and at the locations shown on the Drawings or indicated in the Specifications. Geotextile Fabric.
   1. Product: 160N by Mirafi.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 - EXECUTION

3.01 GENERAL

A. Familiarization: Prior to all Work of this Section, the Contractor shall become thoroughly familiar with the site, the building and site conditions, and all portions of the Work covered by this Section. The Contractor shall satisfy himself, by actual examination of the site of the Work, as to the existing conditions, contours and elevations and the amount of Work required under this Section.

B. Conditions: The Contractor acknowledges that he has satisfied himself as to the nature and location of the Work, the general and local conditions, particularly those bearing upon site access and transportation, disposal, handling, and storage of materials, availability of labor, water, electric power, roads and uncertainties of weather, ground water table or similar physical character of equipment and facilities needed prior to and during the prosecution of the Work and all other matters which can in any way affect the Work or the cost thereof under this Contract. Any failure by the Contractor to acquaint himself with all available information concerning these conditions will not relieve him from responsibility for estimating properly the difficulty and cost of successfully performing the Work.

C. Coordinate the building pad earthwork in accordance with the Drawings, Geotechnical Report recommendations, field measurements, manufacturer's data, trade practices, and as specified herein.

D. Remove all trees, shrubs, saplings, brush, vines, stumps and other debris as required.

E. Stripping of Unsuitable or Surplus Materials: All topsoil, peat, organic materials, debris, frozen or saturated soils, muck, loose or disturbed soils, pre-existing fills, any other fills that cannot be compacted properly or other unsuitable or surplus materials shall be stripped to their entire

depths from building pad area. All excavations shall be performed in a manner to minimize the disturbance of underlying natural ground to remain.

F. All excavations whether cut, general excavation, or trenching shall conform to the following provisions as applicable:
   1. Extent: Excavation shall be performed to elevations and dimensions indicated or implied, plus sufficient space to permit erection of forms, shoring, drains, construction of structures, and the inspection of the Work. Excavations shall extend beyond the indicated or implied limits if necessary to remove all traces of loam, peat, waste, or other unsuitable materials. Excavation shall include all trenching required for the installation of items where the trenching is not specifically described on the Drawings or in other Sections of these Specifications.

G. Cold Weather Excavation: Do not excavate to full indicated depth when freezing temperatures may be expected, unless fill materials, footings or slabs can be placed immediately after the excavation has been completed. Protect the excavation from frost if placing of concrete or additional fill for compaction is delayed.
   1. Where footings and slabs are exposed to freezing temperatures, they shall be protected to prevent frost penetration into the subbase and subgrade beneath the concrete.
   2. Fill shall not be placed over frozen sub base or subgrade material. Soil that is frozen shall be removed prior to placement of compacted fill. Remove all frozen uncompacted fill prior to placing additional fill for compaction. Placement of compacted fills shall not be conducted when air temperatures are 30 degrees F, or below, to prevent moisture in the fill from freezing before placement.

H. Maintain a dewatered and stable subgrade during construction. Efforts shall be made to prevent surface water run-off from collecting in excavations. Subgrade fills that become unstable shall be removed and replaced with granular fill or as recommended by the Geotechnical Engineer.
   1. Perimeter foundation and underslab drains are required. Refer to Section 33 46 00 Subdrainage, 02 32 10 - Subsurface Investigations and the Drawings.
   2. Foundation waterproofing shall be provided under Section 07 14 00 – Fluid Applied Waterproofing.

I. Dewatering:
   1. Dewatering is expected to be required to permit construction in the dry. The groundwater level shall be lowered prior to excavation to a minimum of two (2) feet below the anticipated excavation depth. The proposed dewatering system shall be reviewed by the Geotechnical Engineer prior to implementation by the Contractor.
   2. Provide and maintain at all times during construction, ample means and devices with which to promptly remove and dispose of all water from every source entering the excavations or other parts of the Work. Dewater by means that will ensure dry and stable excavations, the preservation of the final lines and grades of bottoms of excavations, and minimize disturbance of underlying natural ground. Provide adequate pumping equipment, including standby equipment.
   3. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.
      a. Do not place, spread, or roll any fill material during unfavorable weather conditions. Do not resume operations until moisture content and fill density are satisfactory to the Architect.
      b. Provide berms or channels to prevent water from entering excavations, ponding on prepared subgrades, and flooding Project site and surrounding area. Promptly remove all water collecting in depressions.
      c. If the excavation to subgrade has been softened or damaged by erosion, flooding, placement during unfavorable weather or other causes, remove all disturbed and saturated soils, re-fill and re-compact as specified. Following the Geotechnical Engineer's approval, crushed stone, approximately 3/4” average size, completely wrapped in filter fabric may be used to stabilize subgrade soils. Perform work to

repair the subgrade prior to proceeding with the normal course of the Work on the subgrade.

4. The engineering, construction, maintenance and removal of all berms, cofferdams and all other systems required for excess water control and diversion shall be the sole responsibility of the Contractor.
5. Dispose of water pumped or drained from construction site in a legal and suitable manner to avoid public nuisance, injury to public health, damage to public and private property, and damage to the Work completed or in progress.
    a. The drainage of all water resulting from pumping shall be recharged into the ground in a nearby excavation, to the extent feasible. Discharge to municipal storm drain systems shall be performed only with approval of the Architect and in accordance with all regulations and required permits.
    b. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey runoff and water removed from excavations to collecting areas. Do not use trench excavations as temporary drainage ditches.
    c. Water shall pass through a sediment trap prior to discharge.

3.02 STABILITY OF EXCAVATIONS

A. The Contractor is solely responsible for the protection of the excavations.

B. Provide shoring, sheeting, and/or bracing of excavations as required to assure complete safety against collapse of earth at sides of excavations. Alternatively, lay back excavations to a stable slope.

C. Comply with local, and State safety regulations and with the provisions of the Occupational Safety and Health Act (OSHA).

3.03 INSPECTION OF SUBGRADES

A. Inspection of Subgrades: Notify the Geotechnical Engineer and Architect when excavations have reached required subgrade prior to the placement of any fill material or concrete formwork. The Geotechnical Engineer shall assess foundation excavation and preparation efforts to determine compliance with recommendations of the geotechnical report. Do not cover subgrades until accepted by the Geotechnical Engineer. Should bearing materials at subgrade be determined to be unsuitable, continue excavation until suitable bearing materials are encountered, as determined by the Geotechnical Engineer. Replace excavated material with Select Granular Fill as directed by the Geotechnical Engineer. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities as directed by the Geotechnical Engineer, at no cost to the Owner.

3.04 PREPARATION OF SUBGRADES FOR STRUCTURES

A. Footings and Slabs:
    1. Over-excavation may be required to remove locally weak, disturbed or otherwise unacceptable bearing soils. Fills within the building limits and the Zone of Stress Influence for footings shall be compacted Select Granular Fill. Final excavations shall be made by smooth bladed equipment to minimize soil disturbance.
    2. Following excavation to bearing grades in naturally occurring sand deposits, the exposed surfaces shall be proofrolled to densify any naturally occurring loose zones or those created during the excavation process. Proofrolling shall consist of 3 to 5 passes of a 10-ton vibratory roller, or equivalent effort. Care shall be taken to avoid adverse impacts of the proofrolling to existing foundations to remain. Should unstable areas develop during proofrolling due to excess moisture, vibratory proofrolling efforts shall be stopped and static methods employed. Footing trench bases shall be proofrolled using at least six (6) passes of a 700 pound vibratory plate compactor.
    3. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, installing services and other construction, and for inspection.
    4. Excavation for Underground Tanks, Basins, Mechanical or Electrical Items: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 0.10 foot. Do not disturb bottom of excavations intended for bearing surface.

B. Floor Slabs:
   1. Place a minimum (6) six inch thick layer of 3/4" clean crushed stone, on top of minimum 6 oz per square yard non-woven geotextile fabric, below the bottom of the slab. A minimum (4) four inch thickness of compacted Structural Fill shall be placed between tops of footings and bottoms of slabs.

C. Protection of Bearing Surfaces: The silty bearing soils are expected to be susceptible to disturbance by water and worker traffic. Care shall be taken to prevent surface water from collecting on exposed bearing surfaces. Traffic over bearing surfaces shall be minimized. Additional stabilization of bearing surfaces will be likely at the ground floor level, including over excavation, placement of geotextile fabric and crushed stone. Stabilization techniques shall be determined by the Geotechnical Engineer on a case-by-case basis.

D. Granular Fill and Compaction:
   1. To the extent practicable, each layer of fill shall be compacted to the specified density the same day it is placed. Select Granular Fill that is too wet for proper compaction shall be dried to the proper moisture content, or removed and replaced.
   2. Select Granular Fill shall be placed systematically in horizontal layers not to exceed twelve (12) inches thick. Compaction equipment in open areas shall be large self-propelled vibratory rollers with a minimum compactive energy of 25,000 lbs. In confined areas, hand operated vibratory plate compaction equipment or a walk behind vibratory roller shall be used with a maximum placed layer of six (6) inches. A minimum of four systematic passes of compaction equipment shall be used to compact each lift.
   3. All Select Granular Fill placed within the building pad to the bottom of slab elevation shall be compacted to at least 95 percent of the maximum dry density as determined by ASTM D1557.
   4. Only Select Granular Fill shall be used as backfill for all foundation excavations and fill within the building pad as defined above. Structural Fill shall extend to the lateral limits defined as 1 foot horizontally and then 1 horizontal and 1 vertical line sloped down and outward from the bottom outside edge of foundations and floor slabs supported by fill (Zone of Stress Influence).
   5. Compaction Around Structures: No heavy machinery shall be allowed within five (5) feet of the structure during placing. Material shall not be placed until slabs have been poured and set and the structure can satisfactorily withstand the loads imposed by fill and backfill. Only Structural Fill shall be used as backfill of footings, piers and foundation walls. Backfills at structures shall be brought up evenly on all sides to avoid damage to the structure by uneven loading. All lifts shall be properly compacted.
      a. Use extra care when compacting adjacent to walls. Where walls are buried on both sides, backfill and compaction shall proceed on both sides of the wall so that the difference, in top of fill level on either side of the wall shall not exceed two (2) feet at any stage of construction. Where backfill of buried wall is only on one side, only a hand-operated roller or plate compactor shall be used within a lateral distance of five (5(feet of back wall for walls less than fifteen (15) feet high and within ten (10) feet of back of wall for walls more than fifteen (15) feet high.
   6. Backfill excavations, promptly, but not before completing the following:
      a. Acceptance of construction below finish grade including waterproofing, foundation drains and perimeter insulation.
      b. Surveying locations of underground utilities for record documents.
      c. Testing, inspecting, and approval of underground utilities.
      d. Concrete formwork removal.
      e. Removal of trash and debris from the excavation.
      f. Removal of temporary shoring and bracing, and sheeting.
      g. Installing permanent or temporary horizontal bracing on horizontal supported walls.
   7. Frozen materials shall not be placed in the backfill nor shall materials be placed upon frozen materials. Previous frozen materials shall be removed or shall be otherwise treated as required before new backfill is placed.

8. Any Fill material that is placed below or around the building foundations or below pavement areas that the does meet the requirements as stated herein or within the Geotechnical Engineering Report without prior approval from the Geotechnical Engineer and Architect, becomes unstable during compaction efforts due to excess moisture, or becomes saturated due to precipitation shall be removed and replaced as directed by the Geotechnical Engineer at no cost to the Owner.

E. s **OFF-SITE DISPOSTION OF EXCESS EXCAVATED SOILS**

1. The Contractor shall manage and legally dispose off-site all excess or unsuitable generated materials that cannot be reused on-site. Excess or unsuitable excavated materials shall be removed from the site and transported to appropriate facilities or locations in accordance with all local, state, federal regulations, the RCMP, and the requirements herein. All excavated excess or unsuitable materials will become the property of the Contractor. Materials excavated from the site shall not be transported or used at schools, public parks, residential properties, day care facilities or other environmentally-sensitive site. Prior to removal of excavated materials from the site, the Contractor shall notify the Owner of the proposed disposal site(s) and receive approval from the Owner prior to removal and disposal of the materials. All excavated materials proposed for off-site disposal or reuse shall be tested in accordance with the requirements of the receiving facility at the Contractor's expense. If off-site reuse or disposal is proposed at a location other than a licensed treatment or disposal facility, soil shall be tested in accordance with requirements set by the Engineer.
2. The Contractor shall coordinate and contract with applicable receiving facilities and complete all associated paperwork. Copies of all associated paperwork shall be provided to the Owner within seven (7) days of removal of the material from the site.
3. Excavated soils and materials removed from the site shall be loaded within the site limits. All trucks leaving the site shall be covered and cleaned of debris that might fall from the trucks during transport.
4. The Contractor shall take measures to prevent debris or water from being spilled from trucks or tracked from the site onto local streets. The Contractor shall sweep off-site streets as necessary or as directed by the Owner.

END OF SECTION