Westby Hall – Façade & Courtyard Restoration

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SECTION I
INSTRUCTIONS TO BIDDERS

1B1. BID PROPOSALS

1B1.1. Sealed proposals for the work described herein must be received and time-stamped at the University. The closing date and time for bids will be stated in the Advertisement and Invitation to Bid. Bidders are cautioned that reliance of the U.S. Mail for timely delivery of proposals is at the bidder's risk. Failure by the contractor to have sealed proposals reach the University by the prescribed time will result in a return of the submission unopened and unread.

1B1.2. This contract will be bid as a single prime contract only. Bids for less than all of the project as described herein will be deemed nonconforming.

1B1.3. The Instructions to Bidders, Bid forms, Contract forms, plans and specifications, forms of Bid Bond, Agreement of Surety, Performance Bonds, Payment Bonds and other contract documents may be examined at the University. Contractors may obtain contract documents at the University’s Purchasing Website. The University reserves the right to deny award to any bidder who is not clearly responsible based upon experience, past performance and financial capability to perform the work required hereunder or other material factors.

1B1.4. Set(s) of contract documents will be available for inspection by interested parties free of change in Rowan University’s Purchasing Department.

1B1.5. Bid proposals based upon the plans, specifications, general, special and supplementary conditions, clarifications and/or addenda shall be deemed as having been made by the contractor will full knowledge of all project conditions. Bidders are required to visit the site prior to submitting proposals for the work herein described and to have thoroughly examined the conditions under which the contract is to be executed including those reasonably observable conditions of the premises which would hinder, delay or otherwise affect the performance of the contractor required under the terms of the contract. The University will not allow claims for additional costs as a result of the contractor’s failure to become aware of the reasonably observable conditions affecting his/her required performance. The bidder is required to make appropriate allowances in the preparation of his/her bid for the accommodation of such conditions. Bidders must warrant in the bid documents that the bidder is familiar with conditions existing at the site at the time the bid is submitted.

1B1.6. Bid proposals shall be submitted on the standard form provided by the University, enclosed in a sealed envelope issued by Rowan University. The name and address of the bidder must be indicated on the envelope as well as indication of the project, project location and other appropriate identification.

1B1.7. All amounts in the bid documents shall be stated in numerical figures only.

1B1.8. The bidder must include the following items in the bid envelope. Other documents may be required by the University Purchasing Department. Check the University’s website for further information on required documents.
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a. The proposal signed by the bidder;
b. The executed Affidavit of Non-collusion;
c. Bid security as further described in Paragraph 1B6;
d. The completed set of bid forms found after the Table of Contents;
e. The names and license numbers of and evidence of performance security form of all sub-contractors to whom the bidder will sub-contract any of the work on the project for the following:
   1) The plumbing and gas fitting work;
   2) The heating and ventilating systems and equipment;
   3) The electrical work including any electrical power plants;
   4) The structural and ornamental iron work.

1B1.9. Proposals shall remain open for acceptance and may not be withdrawn for a period of sixty (60) days after the bid opening date.

1B1.10. Proposals not submitted and filed in accordance with instructions contained herein and in the Advertisement will be considered informal and rejected as non-responsive.

1B2. BID MODIFICATION

1B2.1. A bidder may modify his/her bid proposal by telegram or letter at any time prior to the scheduled closing time for receipt of bids provided such communication is received by the University prior to such closing time. A written confirmation of any telegraphic modification signed by the bidder must have been mailed and time-stamped by the post office prior to specified closing time. Such confirmation shall be accompanied by a newly executed Affidavit of Non-Collusion.

1B2.2. Telegraphic communications shall not reveal the basic bid price but only shall provide the amount to be added, subtracted or modified so that the final price(s) or term(s) will not be revealed until the sealed proposal is opened. If written confirmation of the telegraphic modification is not received within two (2) working days after the scheduled closing time, no consideration will be given to the telegraphic modification.

1B2.3. Bids may be withdrawn upon written request received from the bidder prior to the time fixed for the bid opening. Right for withdrawal of a bid is lost after a bid has been opened. If any error has been made in the bid amount, request for relief from the bid may be made in writing to the University. The written request shall be signed by an authorized corporate officer. A determination of whether the bidder will be released shall be at the sole discretion of the University who shall issue his/her finding(s) within five (5) days of his/her receipt of all pertinent information relating to such request for relief.

1B3. CONSIDERATION OF BIDS

1B3.1. Award of Projects (s) or Rejection of Bid(s):

   a. The project will be awarded to the lowest responsible bidder whose bid, conforming to the Bidding Documents, will be most advantageous to the University. The award will be made or the bid(s) rejected within sixty (60) days from the date of the opening of the bids.
b. All bid deposits of unsuccessful bidders, except the lowest three (3) bidders, will be returned or refunded within five (5) days of the bid opening.

c. The bid security deposits of the successful bidder and the next two (2) lowest bidders will be retained by the University until the execution and delivery of a formal contract and delivery of performance and payment bonds by the bidder awarded the project. At such time, bid deposits of the other two (2) low bidders will be returned.

d. The University reserves the right to award the project on the basis of the single bid for the entire work on or the basis of a separate bid and alternate, or any combination of separate bids and alternates, which the University deems best serves the interest of the University.

e. The University reserves the right to waive, in his/her sole discretion, any bid requirements when such waiver is in the best interests of the University and where such waiver is permitted by law.

f. The University reserves the right to reject any and all bids when such rejection is in the best interests of the University. The University may also reject the bid of any bidder who, in its judgement, is not responsible or capable of performing the project based on financial capability, past performance or experience. A bidder whose bid is so rejected may request a hearing before the University by filing a written notice within seven (7) days of the transmittal of the rejection.

1B3.2. The bidder to whom the project is awarded shall execute and deliver the requisite contract documents including payment and performance bonds within the time specified. Upon his/her failure or refusal to comply in the manner and within the time specified, the University may either award the contract to the next low, responsible bidder or re-advertise for new proposals. In either case, the University may hold the defaulting bidder and his/her surety liable for the difference between the applicable sums quoted by the defaulting bidder and that sum which the University may be obligated to pay to the contractor who undertakes to perform and complete the work of the defaulting bidder.

1B4. AWARDS

1B4.1. In executing a contract, the successful bidder agrees to perform his/her work in a good and workmanlike manner and to complete portions of the work by established milestone dates and all work within the number of calendar days specified in his/her contract.

1B4.2. The successful bidder will be notified of the time and place for the signing of the contract. Key requirements in the conduct of the contract including, but not limited to, project milestones, the number of days for performance of the contract, manner and schedule of payments, site logistics and other administrative details will be reviewed at the award meeting. The time and place of the first job meeting will also be announced.

1B4.3. The project shall be awarded to the lowest responsible bidder whose bid, conforming to the Bidding Documents, will be the most advantageous to the University. Alternatives will be accepted or rejected as selected by the University. Add alternates and deduct alternates will be specified separately. The University may choose from the add and deduct alternates without priority between the two groups.
may accept alternates out of sequence provided it states its reasons for so doing.

1B4.4. Should submission of unit prices be required for specific items of work in bid proposals, they will be considered in the evaluation of bids.

1B4.5. LIQUIDATED DAMAGES ARE PART OF THIS PROJECT. Please refer to Section 017700 Contract Closeout in the Project Manual.

1B5. QUALIFICATIONS OF BIDDERS

1B5.1. If the successful bidder is a corporation not organized under the laws of the State of New Jersey, or is not authorized to do business in this state, the award of the project shall be conditioned upon the prompt filing by the said corporation of a certificate to do business in this state and shall comply with the laws of this state in that regard. This filing must be made within the Department of State. No award of project will be made until the Department of State confirms this authorization.

1B5.2. The University requires that each contractor shall perform a minimum of thirty-five percent (35%) of the contract work by his/her own forces. The University, however, may, in its sole discretion, reduce this percentage depending upon the nature and circumstances in any particular case if he/she determines that to do so would be in the best interests of the University provided that a written request is submitted to him/her with the original bid proposal.

1B5.3. The University reserves the right to reject a bidder at any time prior to the signing of a contract if information or data is obtain which, in the opinion of the University, adversely affects the responsibility and/or the capability of the bidder to undertake and to complete the work regardless of the bidder's previous qualification or classification. The University may conduct any investigation as it deems necessary to determine the bidder’s responsibility and capacity and the bidder shall furnish all information and data for this purpose as the University may request.

1B5.4. The bidder shall include a list of the sub-contractors to whom the bidder will sub-contract work with his/her bid for:

a. the plumbing and gas fitting work;
b. the heating and ventilating systems and equipment;
c. the electrical work including any electrical power plants;
d. the structural and ornamental iron work; and
e. special categories as may be required.

1B6. DEPOSIT AND BID BOND

1B6.1. Each proposal shall be accompanied by a bid bond or by a certified or cashier's check made payable to the University equal to ten percent (10%) of the amount of the proposal as evidence of good faith which guarantees that, if the proposal submitted by the bidder is accepted, the bidder will enter into the contract and furnish the required contract documents and surety bonds. If a bid bond is submitted, it shall also provide that the surety issuing the bid bond be bound to issue the required payment and performance bonds if the bidder is awarded the project. If the bidder...
whose proposal is accepted is unable to provide the performance and payment bonds or fails to execute a contract, then such bidder and the bid bond surety shall be obligated to pay to the University the difference between the amount of the bid and the amount which the University contracts to pay another party to perform the work. The University reserves the right to retain any certified or cashier's check deposited hereunder as reimbursement for the difference as aforesaid and shall return any non-required balance to the bidder. Should there be a deficiency in the excess of the bid deposit, the bidder and the surety shall pay the entire amount of the University's difference in cost upon demand. Nothing contained herein shall be construed as reason of a default or breach by the contractor. Certified or cashier's checks or bonds submitted by the unsuccessful bidders will be returned after the contract has been executed. Contractors electing to furnish a bid bond must include consent of surety, both in form acceptable to the University.

1B6.2. Attorneys-in-fact who sign bid bonds or contract bonds must file a certified power of attorney with the University indicating the effective date of that power.

1B7. PERFORMANCE AND PAYMENT BONDS

1B7.1. Within five (5) calendar days, the successful bidder shall furnish a performance bond in statutory form in an amount equal to one hundred percent (100%) of the total contract price as security for the faithful performance of this contract and also a payment bond in statutory form in an amount equal to one hundred percent (100%) of the contract price as security for the payment of all persons and firms performing labor and furnishing materials in connection with this contract. The performance and payment bond may be in one or in separate instruments in accordance with the law. No contract shall be executed unless and until each bond is submitted to and approved by the University and the surety must be presently authorized to do business in the State of New Jersey. The surety's obligation shall continue beyond final acceptance to the extent that the contractor would have such an obligation.

1B7.2. The cost of bonds shall be paid for by the contractor.

1B7.3. At any time, if the University is dissatisfied with any surety or sureties, who have issued or proposed to issue, the performance or payment bonds for justifiable cause, the contractor shall substitute an acceptable bond or bonds in such form and sum and executed by such other surety or sureties as may be satisfactory to the University within ten (10) days after notice from the University to do so. The premiums of such bonds shall be paid by the contractor. No contract shall be executed and/or no payment made under a contract until the new surety or sureties shall have furnished such an acceptance bond to the University.

1B7.4. Bonds must be legally effective as of the date the contract is signed. Bonds must indicate contractor's names exactly as they appear on the contract. Current attorney-in-fact instruments and financial statement of the surety must be included with the bond. Bonds must be executed by an authorized officer of the surety. Bonds furnished under this article shall conform in all respects to the requirements and language of N.J.S.A. 2A:44-143 to 147.

1B8. BULLETINS AND INTERPRETATIONS
1B8.1. No interpretation of the meaning of the plans, specifications or other pre-bid documents will be provided to any bidder unless such interpretation is made in writing to all prospective bidders prior to the bid opening. Any such interpretations must be identified in bid proposals submitted. Any interpretations which are not entered in accordance with this provision shall be unauthorized and not binding upon the University.

1B8.2. Every request for an interpretation relating to, clarification or correction of the plans, specifications or other bid documents shall be made in writing addressed to the University and must be received at least five (5) working days prior to the date fixed for the bid opening. Any and all interpretations, clarifications or corrections and any supplemental instructions must be issued by the University in writing in the form of bulletins and mailed by certified mail, return receipt requested or by telegraphic notice to all prospective bidders no later than three (3) working days prior to the date of the bid opening. All bulletins issued shall become part of the contract documents and shall be acknowledged in all the bid proposals. Failure of a contractor to acknowledge receipt of all such bulletins and interpretations by the time of the bid opening shall result in his/her proposal being considered non-responsive at the option of the University.

1B8.3. Each bidder shall be responsible for thoroughly reviewing the contract documents prior to submission of bids. Bidders are advised that no claim for expenses incurred or damage sustained on account of any error, discrepancy, omission or conflict in their bid submission will be entertained. Documents shall be recognized by the University unless, and only to the extent that, a written request for interpretation, clarification or correction has been submitted in compliance with section 1B8.2 and the matter has not been addressed by the University through the issuance of a bulletin interpreting, clarifying and/or correcting such error, discrepancy, omission or conflict.

1B9. ASSIGNMENTS

1B9.1. The contractor shall not assign the whole or any part of this contractor without prior written consent of the University. Money due or to become due to the contractor hereunder shall not be assigned for any purposes whatsoever.

1B10. FEDERAL EXCISE TAXES AND STATE SALES TAX

1B10.1. In general, bidders must take into consideration applicable Federal and state tax laws when preparing their bids.

1B10.2. Under Chapter 32 of the Internal Revenue Code, an exemption certificate must be on file with the University of the Division of purchase and Property. (example, Number 22-75-005)

1B10.3. Materials, supplies or services for exclusive use in erecting structures or buildings or otherwise improving, altering or requiring all University-owned property are exempt from the State sales tax.

1B10.4. Bidders must make their own determinations as to the current status and applicability
of any tax laws and the contractor may make no claim based upon any error or misunderstanding as to the applicability of any tax laws.

1B10.5. Purchases or rentals of equipment are not exempt from any tax under the State Sales Tax Act.

1B11. RESTRICTIVE SPECIFICATIONS

1B11.1. Should any bidder determine before the bid due date that any portion of the specifications or drawings specify a particular product which can be provided by one (1) supplier or manufacturer with the result that competitive prices are not available, he/she shall immediately notify the University and Construction Manager of the fact in writing.

1B11.2. If such notice is not given in a timely manner, it shall be assumed that the bidder has included the estimate of such sole source in his/her bid. In the alternative, if the University or Construction Manager are notified in a timely manner of the requirement in the specification of a sole source of supply or manufacture, the University may order the project rebid or may take any other lawful action.

1B12. OFFER OF GRATUITIES

1B12.1. Chapter 48 of the laws of 1954 make it a misdemeanor to offer, pay or give any fee, commission, compensation, gift or gratuity to any person employed by the State. It is the policy of the University to treat the offer of any gift or gratuity by any company, its officers or employees to any person employed by Rowan University as grounds for debarment or suspension of such company from bidding on and providing work or materials on University contracts.

END OF SECTION I
ARTICLE 1 - CONTRACT DOCUMENTS

1.1 DEFINITIONS

1.1.1 "Architect" or "Engineer" means the Architect, Engineer or other design professional engaged by the University to work under the direction of the University's project manager or contracting officer.

1.1.2 Where "as shown", "as indicated", "as detailed" or words of similar import are used, it shall be understood that the reference is made to the drawings accompanying this contract unless otherwise stated. The word "provided", as used herein, shall be understood to mean "provided complete in place"; that is, "furnished and installed".

1.1.3 Bulletin or Addendum: The bulletin or addendum is a document issued by the University prior to opening of bids which supplements, revises or modifies the solicitation documents furnished for bidding purposes.

1.1.4 Change Order Request Form: A request for equitable adjustment made by the Contractor in response to written direction by the contracting officer pursuant to Article 14 entitled "Changes to Contract". Unless otherwise specified by the University, the Contractor shall use Form AIG701

1.1.5 Claims: Differences between the University and a contractor concerning extra work, alleged errors or omissions in the specifications or drawings, unreasonable delays, damages to work, informal suspensions or interferences by University personnel and like matters.

1.1.6 University: The word "University" or "owner" as used herein refers to Rowan University.

1.1.7 University's project manager: An employee of the University (the University's project manager) to provide general administration and project management services as required by the contract documents.

1.1.8 Contract Documents: This contract, together with any plans, drawings, specifications or other documents which are attached hereto or incorporated herein by reference, together with any such plans, drawings, specifications, schedules or other documents which may be produced pursuant to this contract or derived there from and which are intended to bind the contractor hereunder.

1.1.9 Contract Limit Lines: Those lines shown on the drawings which limit the boundaries of the project and beyond which no construction work or activities shall be performed by the contractor unless otherwise noted on the drawings or specifications.

1.1.10 Contract Line Item Number (CLIN): A specifically described unit of work for which a
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price is provided in the contract.

1.1.11 **Contractor** means the person or persons, partnership or corporation named as contractor in this contract operating as an independent contractor and not as an agent of the State in the performance of its functions. Whether referred to as "contractor", "prime contractor", "prime", "separate contractor" or "single contractor", it shall be understood to mean contractor. It does not include suppliers or material men.

1.1.12 **Contracting Officer** means the individual authorized, as an officer of the University, to administer the design, engineering and construction of all University buildings and facilities. He/she is the procuring contracting officer representing the University personally or through University’s project managers in all relationships with contractors, consultants and architects/engineers. This includes a duly appointed successor or an authorized administrative contracting officer (ACO) acting within the limits of his/her authority.

The contracting officer is the interpreter of the conditions of the contract and the judge of its performance. He/she shall not take arbitrary positions benefiting either the University or the contractor but shall use his/her powers under the contract to enforce its faithful performance by both.

1.1.13 Wherever in the specifications or upon the drawings the words "directed", "required", "ordered", "designated", "prescribed" "shall" or words of like import are used, it shall be understood that the "direction", "requirement", "order", "designation" or "prescription" of the contracting officer is intended and similarly the words "approved", "acceptable", "satisfactory" or words of like import shall mean "approved by", "acceptable to" or "satisfactory to" the contracting officer unless otherwise expressly stated.

1.1.14 "**Final Acceptance**" shall mean the acceptance of the Project upon Final Completion.

1.1.15 "**Final Completion**" shall mean the date the project, including all punch list items properly performed by the contractor, all warranties have been transferred to the University and the Contractor has demobilized from the site.

1.1.16 **General Construction Contractor**: The general construction contractor means either the contractor for general construction whenever separate prime contractors are involved in a project or the sole contractor if there are no other prime contractors involved.

1.1.17 **Notice** is a written directive or communication served on the contractor to act or perform work or carry out some other contractual obligation. It shall be deemed to have been duly served if delivered to an individual or member of the firm or entity or to an officer of the corporation for whom it was intended. This includes delivery by courier, registered or certified mail, telegram, facsimile, E-mail or other electronic means to the business address cited in the contract documents.
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1.1.18 **Plans** means any drawings or reproductions thereof pertaining to the details of the work contemplated by this contract.

1.1.19 **Project** is the general term for identification of the total contract. It includes the work and all administrative aspects required to fully satisfy the contract requirements.

1.1.20 **Public Contract**: Any contract or agreement entered into by the State of New Jersey or any instrumentality of the State, including Rowan University, to purchase goods, services or both.

1.1.21 The term **site, construction site or project site** refers to the geographical area of the entire University campus at which the work under the contract is to be performed bounded by the Contract Limits and other areas designated by the University.

1.1.22 **Specifications** means all written agreements, instructions or other documents in or pursuant to this contract pertaining to the method of performing the work and the results to be obtained.

1.1.23 The words **State or Agency of the State**, as are used herein, mean the State of New Jersey or any department or agency of the State.

1.1.24 **Sub-contractor** means the person or persons, partnerships or corporations who enter into a contract with the contractor for the performance of work under this contract or the sub-contractors of any tier of such individual or corporation.

1.1.25 **Substantial Completion**: The date the building or facility is operational or capable of serving its intended use even though all permanent installations are not in place. The determination as to the date of substantial completion shall be made pursuant to Article 8.3 of the General Conditions and other applicable Sections in the Project Manual.

1.1.26 **Schedule of Values** shall mean a detailed list of the work activities required for project construction; including costs allocated thereto to be utilized by the Architect/Engineer in progress payments. The schedule of values shall include all elements associated with fulfilling the requirements of the contract; bonds, insurance, etc.; major items of material or equipment.

1.1.27 The term **work**, as used herein, comprises all construction efforts required by the contract documents and all supervision, labor, material, management and equipment necessary to complete such construction.

1.2 **INTENT OF THE CONTRACT**

1.2.1 The drawings and specifications of the contract are intended to require the contractor to provide for everything necessary to accomplish the proper and complete finishing of the work. All work and materials included in the specifications and not shown on the drawings or shown on the drawings and not in the specifications shall be performed or furnished by the contractor as if described in
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both. Any incidental material and/or work not specified in the drawings and/or specifications which is, nevertheless, necessary for the true development thereof and reasonably inferable therefrom, the contractor shall understand the same to be implied and required and he/she shall perform all such work and furnish all such materials as if particularly delineated or described therein. Should there be an obvious error or omission in the drawings or specifications, it shall be the contractor's responsibility to complete the work as reasonably required consistent with the intent of such drawings and specifications.

1.2.2 The contractor shall abide by and comply with the true intent and meaning of the drawings, the specifications and other contract documents taken as a whole and shall not avail himself/herself of any unintentional error or omission should any exist. Should any error, omission or discrepancy appear or should any doubt exist or any dispute arise as to the true intent and meaning of the drawings, the specifications or other contract documents, or should any portion thereof be obscure or capable of more than one interpretation, the contractor shall immediately notify the contracting officer or the University's project manager and seek correction or interpretation thereof prior to commencement of affected work. The contracting officer shall issue his/her interpretation with reasonable promptness. However, the contractor shall make no claim against the University for expenses incurred or damages sustained on account of any error, discrepancy, omission or conflict in the contract documents unless, and only to the extent that, the contractor has submitted a written request for interpretation, clarification or correction to the Architect/Engineer and the contracting officer through the University's project manager and such written request has been received by the Architect/Engineer and the contracting officer at least five (5) working days prior to the date fixed for the opening of bids provided further that such claim shall only be recognized by the University if the matter raised by the written request has not been addressed by the University through the issuance of an addendum interpreting, clarifying and/or correcting such error, discrepancy, omission or conflict. In case of dispute, the matter shall be referred to the contracting officer for decision.

1.2.3 Each and every provision required by law to be inserted in the contract documents shall be deemed to have been inserted therein. If any such provision has been omitted or has not been correctly inserted, then, upon application of either party, the contract shall be physically amended to provide for such insertion or correction.

1.2.4 The organization of the specifications into divisions, sections and articles and the arrangement of drawings shall not be construed by the contractor as being intended to divide or allocate the work among sub-contractors in any manner or to establish the extent of the work to be performed by any trade.

1.2.5 N/A

1.2.6 The contractor shall do no work without proper drawings and instructions unless authorization to proceed from the contracting officer or someone designate by the contracting officer is received in writing by the contractor. In giving such additional instructions, the contracting officer may make minor changes in the work not
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involving extra cost.

1.2.7 All drawings referred to, together with such supplementary details as may be furnished and approved from time to time as the work progresses, are understood as being included as part of the contract to which they relate.

1.2.8 In the event of a conflict between provisions of the contract documents, the documents shall take precedence in the following order:

(a) Executed Contract
(b) Addenda
(c) Supplemental General Conditions
(d) General Conditions
(e) Specifications
(f) Drawings in the following order of precedence:
   (1) notes on drawings
   (2) large scale details
   (3) figured dimensions
   (4) scaled dimensions

Where there may be a conflict not resolvable by application of the provisions of this paragraph, then the contractor shall accept the condition more favorable to the University. In the event the conflicting condition is one of physical materials, equipment and/or labor then the more expensive labor, materials or equipment shall be assumed to be required and shall be provided by the contractor.

1.2.9 On all work involving alterations, remodeling, repairs or installation within existing buildings, it shall be the responsibility of the contractor by personal inspection of the existing building, facility, plant or utility system to satisfy himself/herself as to the accuracy of any information given which may affect the quantity, size and/or quality of materials required for a satisfactorily completed contract whether or not such information is indicated on the drawings or is included in the specifications. All contracts shall include the cost of all material and labor required to complete the work.

1.2.10 Dimensions of the work shall not be determined by scale or rule and figured dimensions shall be followed at all times unless obvious discrepancies exist. The contractor shall verify all dimensions at the job site and shall take any and all measurements necessary to verify the drawings and to properly lay-out the work. Any discrepancies affecting the lay-out of the work shall be called to the Architect's/Engineer's attention. No work so affected shall proceed until such discrepancy is corrected and the Architect/Engineer provides written confirmation of the resolution to the University's project manager.

1.2.11 Where on any drawing a portion of the work is fully drawn and the remainder is indicated in outline form, the portions fully drawn shall apply to all other like portions of the work unless specifically indicated or specified otherwise.
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1.2.12 All indications or notations which apply to one of a number of similar situations, materials or processes shall be deemed to apply to all such situations, materials or processes whether they appear in the work except where a contrary result is clearly indicated by the contract documents.

1.2.13 Where codes, standards, requirements and publications of public and private bodies are referred to in the specifications, references shall be understood to be to the latest revision prior to the date of receiving bids except where otherwise indicated.

1.2.14 Where no explicit quality or standards for materials or workmanship are established for work, such work is to be of good quality for the intended use.

1.2.15 All manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the manufacturer's written or printed directions and instructions unless otherwise indicated in the contract documents.

1.2.16 The mechanical, electrical and fire protection drawings are diagrammatic only and are not intended to show the alignment, physical locations or configurations of such work. Such work shall be coordinated by the Contractor and shall be installed to clear all obstructions, permit proper clearances for the work of other trades, satisfy all code requirements and present an orderly appearance where exposed at no additional cost to the Owner.

ARTICLE 2 - CONTRACTING OFFICER

2.1 CONTRACTING OFFICER'S RIGHT TO STOP THE WORK

2.1.1 If the contractor fails to correct defective work or fails to carry out the work in accordance with the contract documents, the contracting officer may order the contractor to stop the work, or any portion thereof, until the cause for such order has been eliminated. Stoppage of the work, however, shall not render the University liable for claims of any kind, including delays sustained by the contractor as the result of the stoppage of the work and there shall be no extension of time to the schedule allowed.

2.2 CONTRACTING OFFICER'S RIGHT TO TERMINATE FOR CAUSE

2.2.1 If the contractor makes a general assignment for the benefit of his/her creditors, if a receiver is appointed on account of his/her insolvency or if he/she persistently or repeatedly refuses or fails, except in cases for which extension of time is provided, to supply enough properly skilled workers or proper materials so as to avoid or eliminate delays in the orderly progress of the work in accordance with the approved schedule, or if he/she fails to make prompt payment to sub-contractors or for materials or labor, or persistently disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, or if he/she or any of his/her sub-contractors is guilty of a substantial violation of a provision of the contract
documents or otherwise defaults or neglects to carry out the work in accordance with the contract documents, then the contracting officer may, without prejudice to any right or remedy and, after giving the contractor and his/her surety three (3) working days written notice to forthwith commence and continue correction of such default or neglect with diligence and promptness, terminate the employment of the contractor by the issuance of a written notice to that effect to the contractor and his/her surety at any time subsequent to three (3) working days thereafter should they, or either of them, fail to comply with the demands of the original three (3) day notice as mentioned above.

2.2.2 Upon such termination, the contracting officer may take possession of the site and of all the materials, equipment and tools on the site and may finish the work by whatever method he/she may deem expedient. In such case, the contractor shall not be entitled to receive any further payment until the work is finished. The person or firm designated to carry out such work will be paid as authorized by the contracting officer without entailing any personal liability upon the officers of the University issuing certificates or making such payment(s).

2.2.3 If the unpaid balance of the contract sum exceeds the cost of finishing the work, including liquidated damages for delays and all consequential damages sustained by the University flowing from such breach of contract, such excess shall be paid to the contractor. If such costs exceed the unpaid balance, the contractor and/or his/her surety shall pay the difference to the University promptly upon demand and this obligation shall survive the termination of the contract.

2.2.4 If, within three (3) working days following receipt of notice of termination by the contractor's surety, the issuer of the performance and payment bonds, the said surety exercises its right to take over the work and expeditiously commences to prosecute the same to completion, the contracting officer shall permit him/her to do so under the following terms and conditions:

(a) evidence of the surety's intention to take over and complete the contract shall be in writing over the signature of a University project manager and served upon the contracting officer within three (3) days after receipt by the surety of notice of termination

(b) the execution of a written agreement between the University, by the contracting officer, and the surety whereby the latter undertakes and assumes the obligation to complete the balance of the work of its defaulting contractor in accordance with the terms and conditions of the University contractor agreement, to be performed by a substituted contractor satisfactory to the contracting officer, at the surety's sole cost and expense, and providing for payments to the surety or to the substituted contractor of unpaid contract balances, if any, then in the hands of the University

(c) the said agreement shall also expressly provide that the surety shall not be relieved thereby from any of its obligations under the performance and payment bonds and that it furnishes the University with an additional performance and payment bond to secure the faithful performance of the
substituted contractor

(d) that all current obligations for labor and materials incurred and outstanding by the defaulting contractor on this project be paid without delay, subject to allowance of a reasonable time within which to verify such claims by the surety

(e) that the parties expressly understand and agree that this agreement is without prejudice and is subject to such rights and remedies as either party, including the contractor, may elect to assert after final completion and acceptance of the work

2.2.5 Right to Terminate for Convenience: The contracting officer reserves the right to terminate for the convenience of the University in which case the contractor shall be entitled to a proportion of the fee for which the services actually and satisfactorily performed by the contractor shall bear to the total services contemplated under this agreement, less payments previously made, together with appropriate reimbursable costs and a reasonable termination fee to be negotiated between the contractor and the contracting officer.

2.3 REVIEW OF CONTRACTOR CLAIMS AND DISPUTES

2.3.1. In the event of a dispute other than a Change Order dispute between the Contractor and the University, the Contractor may request, in writing, a hearing of any claim, dispute or matter in question relating to this contract. The University shall then designate a Hearing Officer, who may be the University's designee under this contract. The Hearing Officer shall not side with the University or the Contractor but shall use his/her powers to enforce faithful performance by all.

2.3.1.1 The Hearing Officer shall permit both the Contractor and the University to provide such relevant information to the Hearing Officer and each other, as the Hearing Officer needs to render a decision. Upon rendering a decision, the Hearing Officer will memorialize that decision in writing.

2.3.1.2 In the event that both the Contractor and the University agree with the Hearing Officer's decision, each will acknowledge its acceptance in writing.

2.3.1.3 In the event that the dispute is not resolved as set forth in Paragraph 2.3.1.2 hereof, then the University shall review all information provided to the Hearing Officer pursuant to Paragraph 2.3.1.1 hereof and the finding of the Hearing Officer and shall issue a final decision which shall be reduced to writing and a copy provided to the University's designee and the Contractor.

2.3.1.4 Pending such final decision, the Contractor shall have no recourse to court actions, assuming that the aforesaid administrative procedures take place within a reasonable amount of time. Upon receipt of the final decision, either party may then commence appropriate legal proceedings.

2.3.1.5 Unless and until it is determined as a result of any legal proceedings that the University is in material breach of this contract the Contractor shall proceed diligently with the performance of its contract responsibilities.

2.4 UNIVERSITY REPRESENTATION
2.4.1. The University shall be represented on the site by a University's project manager. The University's project manager will conduct or contract out on-site inspections, maintenance of logs for construction progress and problems encountered, approval of contractor's requisition for payments subject to final approval by the Architect and contracting officer, attendance at job meetings, the act of liaison with the Architect/Engineer and contractor, preparation and submission of reports on special problems associated with the job, evaluation and processing change orders and generally remain fully cognizant and be kept informed by the contractor of every aspect of ongoing construction. The University's project manager will have only those duties, which are required of an owner. Responsibility for completion of this project, pursuant to the contract documents, remains with the contractor. No right of the University exercised hereunder shall be considered a waiver of the contractor's obligation or any obligations created by this agreement, which may be modified or excused only in accordance with the terms of the contract.

ARTICLE 3 - ARCHITECT/ENGINEER AND CONSTRUCTION MANAGER

3.1 ARCHITECT/ENGINEER

3.1.1 The Architect's/Engineer's has no power or authority to approve changes to the work under this contract and its role is that of consultant to the University.

3.2 ADMINISTRATION OF THE CONTRACT

3.2.1 The Architect/Engineer and the University's project manager will provide a certain portion of the administration of the contract as hereinafter described.

3.2.2 The Architect/Engineer and the University's project manager will monitor the execution and progress of the work and will immediately notify the University of any related problems. The Architect/Engineer and the University's project manager will be provided access to the work at all times. The general contractor shall provide facilities for such access so as to enable the Architect/Engineer and the University's project manager to perform their functions under the contract documents.

3.2.3 The Architect/Engineer and/or the University's project manager will not be responsible for, nor will they have control or charge of, construction means, methods, techniques, sequences of procedures or safety precautions and programs in connection with the work. The Architect/Engineer and/or the University's project manager will not be responsible for, nor have control or charge over, the acts or omissions of the contractor, sub-contractors or any of their agents or employees or any other person performing any of the work but shall have the obligation to immediately inform the contractor, and the contracting officer of any inadequate performance on the project.

In the event that the University's project manager notices any safety violations, the University's project manager shall have the right, but not the obligation, to inform the Contractor and to immediately stop work for any imminent or life threatening danger.
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3.2.4 The University’s project manager, after consultation with the Architect/Engineer, will recommend the rejection of work, which he/she believes does not conform to the contract documents. In his/her opinion, whenever he/she considers it necessary or advisable, he/she may request the contracting officer to provide special inspection or testing of the work whether or not such work has been fabricated, installed or completed. The Contractor shall pay for all such testing whether the work is deemed to conform to the contract document or not.

3.2.5 Both the Architect/Engineer and the University’s project manager will periodically review the contractor’s as-built drawings to determine whether these are up-to-date.

3.3 INSPECTIONS - SUBSTANTIAL AND FINAL COMPLETION

3.3.1 The Architect/Engineer and the University’s project manager will conduct inspections, accompanied by the contractor to determine the dates of substantial and final completion. The Architect/Engineer and the University’s project manager will receive and forward written warranties and related documents required by the contract documents and assembled by the contractor to the contracting officer for his/her review. The Architect/Engineer and the University’s project manager will approve the issuance of a certificate of final completion.

3.4 OWNERSHIP AND USE OF DOCUMENTS

3.4.1 All drawings, specifications and copies thereof furnished to the Contractor by the Architect/Engineer are and shall remain the property of the University. They are reserved to this project only and are not be to be used on any other project. Submission or distribution of documents to meet official regulatory requirements or for any other purposes in connection with the project shall not be construed as derogation of the Architect’s/Engineer's copyright or other reserved rights.

3.5 UNIVERSITY’S PROJECT MANAGER

3.5.1 In addition to the duties specified elsewhere in the contract documents, the University’s project manager and the contractor shall perform as follows in relation to one another:

   a) the contractor will permit the University’s project manager to inspect delivery of any off-site materials that are being requisitioned by the contractor;
   b) upon request by the University’s project manager, the contractor will schedule visits to fabrication plants to inspect the status of various fabricated materials with regard to quality and scheduled delivery; the contractor will allow the University’s project manager access to such facilities;
   c) the contractor will attend a Preconstruction conference and bi-weekly project meetings, or more often if necessary, at times and locations specified by the University’s project manager;
   d) the contractor shall submit to the contracting officer, through the University’s project manager, all information or requests concerning scheduling, contract or change order/claims;
e) the University’s project manager will receive, log, transmit and evaluate any requests from the contractor for interpretations of the meaning and intent of the contract documents to the contracting officer and Architect/Engineer;

f) the University’s project manager will monitor all training by the contractor of owner’s representatives for equipment and maintenance procedures.

ARTICLE 4 - THE CONTRACTOR

4.1 REVIEW OF CONTRACT

4.1.1 The contractor has the duty and warrants and represents that he/she has thoroughly examined and is familiar with all the contract documents including, but not limited, the complete set of drawings and specifications of the entire project; all other documents referred to in the advertisement for bids, the specifications, or otherwise; that he/she has noted cases where it is specified that certain work or materials, or both, are to be omitted from the contract and to be furnished or installed by another; that he/she has carefully examined the site and the contract; that from his/her own investigations, he/she has satisfied himself/herself as to the nature and location of the work, the current local equipment labor and material conditions and all matters which may, in any way, affect the work or its performance. The contractor is responsible to check and verify all conditions inside and outside the contract limit lines to determine whether any conflict exists with the work he/she is required to perform under the contract. The submission of a bid is conclusive evidence that the bidder has made such examination and is fully aware of the conditions to be encountered in performing the work including any subsurface condition which could be ascertained by due diligence and as to the requirements of the contract documents. This includes a verification of all elevations, utility locations and other site data. Within the site of the project, there may be public utility structures and, notwithstanding any other clause or clauses of this contract, the contractor shall not proceed with the work until he/she has made diligent inquiry at the utility companies and municipal authorities or other owners to determine their exact location. The contractor shall notify the utility companies and municipalities or other owners involved in writing of the nature and scope of the project and of his/her operation that may affect their facilities or property. The contractor is directed to the fact that the approximate locations of known utility structures and facilities that may be encountered within and adjacent to the limits of the work may be shown on the plans. The accuracy and completeness of this information is not guaranteed by the State and the contractor is advised to ascertain for himself/herself all the facts concerning the location of these utilities. The contractor shall carry out his/her work carefully and skillfully and shall support and secure utility structures so as to avoid damage to them. It is understood and agreed that the contractor has considered all of the permanent and temporary utility facilities in their present and/or relocated positions as shown on the plans and as revealed by his/her site investigation in his/her bid, is cognizant of the limited ability of the State to control the actions of the utilities and has made allowance for the fact that additional compensation will not be allowed for any delays, inconvenience or damage sustained by him/her due to any interference from the said utility facilities or the operation of moving them in his/her bid. As a result of such examination and
investigation, the contractor warrants and represents that he/she fully understands the intent and purposes of the contract documents and his/her obligations there under and that he/she accepts responsibility for and is prepared to execute and fulfill completely by his/her construction work the intent of the contract without exception and without reservation at the price specified in the contract.

4.1.2 The contractor shall carefully study and compare the contract documents during the progress of the work and shall immediately report any error, inconsistency or omission to the University's project manager upon discovery. The contractor shall immediately report any error, inconsistency or ambiguity detected during the course of the project to the University's project manager and shall do no work thereafter which may be affected by such error until the contracting officer, through the University's project manager, has had the opportunity to respond and clarify the work it wants performed in view of this information. Wherever any error, inconsistency or omission appears, it shall be disposed of pursuant to appropriate procedures set forth elsewhere herein.

4.1.3 Unless otherwise ordered in writing by the contracting officer through the University's project manager, the contractor shall perform no portion of the work without approved change orders, approved shop drawings or samples for such portions of the work or other approvals as may be applicable and required by the contract documents.

4.1.4 Unless otherwise provided in the contract documents, the contractor shall provide and pay for all labor, equipment, materials, tools, construction equipment and machinery, water, heat, utilities, transportation and other facilities and services necessary for the proper execution and completion of the work whether or not incorporated or to be incorporated in the work.

4.1.5 At all times, the contractor shall enforce strict discipline and good order among his/her employees and shall not employ any individual who violates these provisions or is unfit or anyone not skilled in the task assigned to him/her on the work.

4.1.6 The contractor shall be obligated to pay the prevailing wage rates set forth in the specifications. He/she shall abide by the requirements of the State's Affirmative Action Program. He/she shall also be responsible to insure that all principles of safety are carried out as further described in Article 12 herein. The contractor shall prepare certified payrolls and shall submit such records to the University as required by New Jersey statute and corresponding regulations.

4.2 NEW JERSEY PREVAILING WAGE ACT

4.2.1 Each contractor or any sub-contractor shall comply with the New Jersey Prevailing Wage Act Laws of 1963, Chapter 150, and all amendments thereto as this Act is hereby made a part of every contract entered into on behalf of the University except those contracts which are not within the contemplation of the Act. Provisions of the Act include:
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a) All workmen employed in the performances of every contract in which the contract sum is in excess of $2,000 and work to which the University is a party shall be paid not less than the prevailing wage rate as designed by the Commissioner of Labor and Industry or his/her duly University's project manager.

1. The contractor and all sub-contractor(s) performing public work for the University who are subject to the provisions of the Prevailing Wage Act shall post the prevailing wage rates for each craft and classification involved as determined by the Commissioner, including the effective date of any changes thereof, in prominent and easily accessible places at the site of the work or at such place or places as are used by them to pay workmen/workwomen their wages.

2. The contractor's signature on the proposal is his/her guarantee that neither he/she nor any sub-contractor is currently listed or is on record by the Commissioner as one who has failed to pay the prevailing wages according to the Prevailing Wage Act.

b) In the event it is found any workman/workwoman employed by the contractor or any sub-contractor covered by the contract in excess of $2,000 for any public work to which the University is a party has been paid a rate of wages less than the prevailing wage required to be paid by such contract, the contracting officer may terminate the contractor's or sub-contractor's right to proceed with the work or such part of the work as to which there has been a failure to pay required wages and may otherwise prosecute the work to completion.

c) Nothing contained in the Prevailing Wage Act shall prohibit the payment of more than the prevailing wage rate to any workman/workwoman employed on a public work.

4.3 SUPERVISION AND CONSTRUCTION PROCEDURES

4.3.1 The contractor shall supervise and direct the work using his/her best skill and attention and coordinate his/her work with his/her sub-contractors. He/she shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions or the work under the contract.

4.3.2 The contractor shall employ a full-time, competent superintendent and necessary foreperson and assistants who shall be in attendance on the project site at all times during the progress of the work. The superintendent shall represent the contractor and all communications given to the superintendent shall be as binding as if given to the contractor. Important communications shall be confirmed in writing. The University reserves the right to require a change in a superintendent if his/her performance, as judged by the contracting officer, is deemed to be inadequate. Upon application in writing to the contracting officer, this requirement for a full-time superintendent may be waived by the contracting officer should he/she determine that such staffing is not required by the University.

4.3.3 The contractor shall hire qualified, able crafts persons in their respective lines of work.
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4.3.4 The various sub-contractors shall have competent superintendents and/or forepersons in charge of their respective portions of the work at all times. They shall not employ a person unfit or unskilled in the work assigned to him/her. If it should become apparent to the University or its consultant that a sub-contractor does not have his/her portion of the work under control of a competent foreperson, the contractor shall take appropriate steps to immediately provide proper supervision.

4.3.5 If due to a trade agreement or otherwise stand-by personnel are required to supervise equipment installation or for any other purpose during normal working hours of other trades, the contractor shall valuate and include the costs thereof in his/her bid price and shall provide said services without additional charge.

4.3.6 The contractor shall give the Architect/Engineer timely notice of any additional drawings, specifications or instructions required to define the work in greater detail or to permit the proper progress of the work.

4.3.7 The contractor shall correct all work incorrectly done at the contractor's own expense.

4.4. RESPONSIBILITY FOR THE WORK

4.4.1 The contractor shall be responsible to the University, the contracting officer, the University's project manager, the Architect/Engineer and to separate contractors having a contract with the University on this project for the acts and omissions of his/her employees, sub-contractors and their agents and employees which injure, damage or delay such other contractors in the performance of their work. This responsibility is not limited by the applicable provisions stated elsewhere herein but is in conjunction with and related thereto.

4.4.2 The contractor shall be responsible for all damage or destruction caused directly or indirectly by his/her operations to all parts of the work, both temporary and permanent, to all affected property including adjoining property.

4.4.3 At his/her own expense, the contractor shall protect all finished work and any stored materials whether on site or off and keep the same protected until the project is completed and accepted. In the case of substantial completion accompanied by beneficial occupancy by the University, the contractor's obligation to protect his/her finished work shall cease simultaneously with the occupancy of the portion or portions of the structure.

4.4.4 The contractor shall defend, protect, indemnify and save harmless the State and the University from all claims, suits, actions, damages and costs of every name and description arising out of, or resulting from, the performance of or failure to perform work under this contract. This responsibility is not limited by the provisions of other indemnification provisions included elsewhere herein or compliance with any other insurance provision.

4.4.5 In order to protect the lives and health of his/her employees, the contractor shall comply with all applicable statutes, laws, rules, and regulations and shall maintain
an accurate record of all cases of death, occupational disease and injury requiring medical attention or causing loss of time from work arising out of and in the course of employment on work under this contract. The contractor alone shall be responsible for the safety, efficiency and adequacy of his/her plant, appliances and methods and, for any damage or injury, which may result from his/her failure or his/her improper construction, maintenance or operation.

4.5 PERMITS - LAW - REGULATIONS

4.5.1 Unless otherwise provided in the contract documents, the contractor shall secure but the University shall pay for all permits and governmental fees and inspections necessary for the proper execution and completion of the work.

4.5.2 All construction work shall be done in accordance with the New Jersey Uniform Construction Code. No work requiring inspections and approvals of construction code officials is to be covered or enclosed prior to inspection and approval by appropriate code enforcement officials.

4.5.3 The work under this contract is exempt from local ordinances, codes and regulations as related to the building and the site on which it is located, except where construction could adversely affect adjacent property, public sidewalks and/or streets. The contractor shall coordinate his/her activities with municipal and/or highway authorities having appropriate jurisdiction.

4.5.4 Soil conservation measures are to be in accordance with the County Soil Conservation District requirements and all pertinent codes and regulations.

4.5.6 The contractor shall comply with all applicable Federal, State and local laws and regulations and all conditions of permits controlling pollution of the environment. Necessary precautions shall be taken to prevent pollution of streams, lakes, ponds, wetlands, ground water and reservoirs with fuels, oils, bitumens, chemicals or harmful materials and to prevent pollution of the atmosphere from particulate and gaseous matter. All sewage disposal work shall conform with the regulations of the State Department of Environmental Protection.

4.5.7 The University will pay for all code inspections; however, it is the contractor's responsibility to request and set up inspections with the appropriate agency for all work requiring inspection, in a timely manner.

4.5.8 Consistent with sub-paragraph 4.4.4, the contractor shall be responsible for and save harmless the University from all fines, penalties or loss incurred for, or by reason of, the violation of any Federal, State of municipal law, rule, regulation or ordinance while the said work is in the process of construction.

4.5.9 Without limiting the foregoing, the contractor shall comply with the Federal Occupational Safety and Health Act of 1970 and all of the rules and regulations promulgated there under and the New Jersey Worker and Community Right-to-Know Act, PL1983 c. 315 N.J.S.A. 34:5A-1, et.seq.
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4.5.10 As a result of a finding, by an appropriate finder of fact, that the contractor caused a substantial violation of a Federal, State or local statute or regulation on said project, the University may declare the contractor to be in default.

4.5.11 Prior to the start of any crane equipment operations, the contractor shall make all necessary applications and obtain all required permits from the Federal Aviation Administration (FAA). The sequence of operations, timing and methods of conducting the work shall be approved by the FAA to the extent it relates to their jurisdiction.

4.6 STORAGE, CLEANING AND FINAL CLEAN-UP

4.6.1 The contractor shall confine his/her apparatus, the storage of his/her equipment, tools and materials and his/her operations and workmen/workwomen to areas permitted by law, ordinances, permits, contract limit lines as established in the contract documents, the rules and regulations of the University or as ordered by the contracting officer and/or University’s project manager and shall not unreasonably encumber the site or the premises with his/her materials, tools and equipment.

4.6.2 At all times during the progress of the work, the contractor shall keep the premises and the job site free from the accumulation of all refuse, rubbish, scrap materials and debris caused by his/her operations to the end that the premises and site shall present a neat, orderly and workmanlike appearance at all times. This is to be accomplished as frequently as is necessary by the removal of such material, debris, etc. from the site and the owner's premises.

4.6.3 Upon completion of the construction, the contractor will remove all his/her tools, construction equipment, machinery, temporary staging, false work, formwork, shoring, bracing, protective enclosures, scaffolding, stairs, chutes, ramps, runways, hoisting equipment, elevators, derricks, cranes, etc. from the project site.

4.6.4 Should the contractor not promptly and properly discharge his/her obligation relating to cleaning and final clean-up, the University shall have the right to employ others and to charge the cost thereof to the contractor after first having given the contractor a three (3) working day written notice of such intent.

4.6.5 In each instance, the clean-up work shall be performed by the contractor.

4.6.6 All construction equipment, materials or supplies of any kind, character or description of value belonging to the contractor which remains on the job site for more than thirty (30) days from the date of the certificate of final acceptance and completion issued by the University to the contractor shall become the absolute property of the University. It shall be disposed of in any manner the University deems reasonable and proper. Disposal costs will be the responsibility of the contractor.

4.7 CUT-OVERS, TIE-INS, INTERRUPTIONS TO EXISTING BUILDINGS
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4.7.1 All cut-overs of inter and tie-ins to existing building shall be scheduled and coordinated in advance with the contracting officer's representative and shall be done at a time convenient to the University so as not to unreasonably interfere with its operations.

4.8 WORKDAYS

4.8.1 Regular working hours shall be 8:00 a.m. to 4:30 p.m. Monday through Friday or as agreed to by the Contractor and University after consultation with the University's project manager. Changes thereto may be granted with written approval of the contracting officer. Any work required to be performed after regular working hours or on Saturdays, Sundays or legal holidays as may be reasonably required consistent with contractual obligations shall be performed without additional expense to the University. The contractor shall obtain approval of the contracting officer through the University's project manager for performance of work after regular working hours or on non-regular workdays at least forty-eight (48) hours prior to the commencement of overtime, unless such overtime work is caused by an emergency.

4.9 DRAWINGS, SPECIFICATIONS, SHOP DRAWINGS, AS-BUILT DRAWINGS

4.9.1 The contracting officer, through the Architect/Engineer or University's project manager, will furnish additional instructions for the proper execution of the work after he/she becomes aware of its need. All drawings and instructions issued by the contracting officer shall be consistent with the contract documents and reasonably inferable therefrom. The work shall be executed in conformity therewith. The contractor shall do no work without proper drawings and instructions. In giving such additional instructions, the contracting officer will have the authority to make minor changes in the work not involving extra cost. Drawings and instructions with such supplementary details as may be furnished or approved are understood to be included and a part of the contract.

4.9.2 Where certain of the work is shown in complete detail but not repeated in similar detail in other areas of the drawings or there is an indication of continuation, the remainder being only shown in outline, the work shown in detail shall be understood to be required in other like portions of the project.

4.9.3 At any time after the execution of his/her contract, the contractor shall not make any claims whatsoever based upon insufficient data or his/her incorrectly assumed conditions nor shall he/she claim any misunderstandings with regard to the nature, conditions or character of the work to be done under the contract and he/she shall assume all risks resulting from any changes in conditions not caused by the University, the contracting officer or the University's project manager which may occur during the progress of the work. In the event that the Contractor alleges that there was insufficient data or that he/she incorrectly assumed any condition or that he/she claims any misunderstanding with regard to the nature, conditions or character of the work, the Contractor shall disclose to the University the method by which he/she intended to perform the work in question as set forth in his/her bid.
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This information must be provided with the initial notice from the Contractor to the University. The Contractor shall not be entitled to any additional compensation based upon clarifications issued pursuant to this section.

4.9.4 If the contractor desires to make any deviations or changes from the requirements of the contract documents, he/she shall obtain the consent of the contracting officer through the University’s project manager or Architect/Engineer to such changes in writing before submitting drawings showing such proposed changes. All drawings submitted by the contractor shall have been checked and approved by him/her before submission. The drawings and specification references shall be noted on all submissions. Failure to comply with these instructions will be sufficient reason to return such drawings to the contractor without any action being taken.

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4.9.9 Wherever any material is specified in accordance with federal specifications, ASTM specifications, American National Standards Institute, Inc. specifications, manufacturer’s association’s specification standards or other standards, the contractor shall present an affidavit to the Architect/Engineer upon request from the manufacturer certifying that the material complies with the particular standard specification. Where necessary and requested or specified, supporting test data shall be submitted to substantiate compliance. All tests required in support of the affidavit shall be at the cost of the contractor.

4.10 SAMPLES

4.10.1 The contractor shall furnish all samples as directed to the University’s project manager who shall forward them to the Architect/Engineer and University for approval. The work shall be in accordance with approved samples. Such samples shall be representative of the actual and the University’s project manager shall submit conditions promptly to the contracting officer after approval by the Architect/Engineer at the beginning of the work as so as give the contracting officer time to examine them. Contractor shall provide all disclaimers, limitations and conditions to contracting officer in order to fully inform contracting officer of potential deviations from the sample, including but not limited to color, texture, type, finish, etc. Any list of samples prepared by the Architect/Engineer is for the contracting officer’s convenience only and shall not be construed as limiting the number of samples, which the contractor shall furnish upon request of the Architect/Engineer or University’s project manager.

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4.12 OPENINGS, CHANNELS, CUTTING AND PATCHING

4.12.1 The contractor shall be responsible for furnishing and setting of sleeves, built-in items, anchors, inserts, etc. for his/her work and for all cutting, fitting, closing-in, patching, finishing or adjusting of his/her work in a new and/or existing construction as required for the completed installation. Where applicable, the contractor shall build these items into the construction.

4.12.2 The contractor shall build recesses, channels, chases, opening and flues and shall leave or create holes where on drawings or where directed for steam, water or other piping, electrical conduits, switch boxes, panel boards, hues and ducts or any other feature of the heating and ventilating work.

4.12.3 The contractor shall close, build-in and finish around or over all openings, chases, channels, pockets, etc. after installation has been completed.

4.13 TESTS

4.13.1 The contractor shall notify the contracting office in writing through the University’s project manager of all work required to be inspected, tested or approved. The notice shall be provided no later than five (5) working days prior to the scheduled inspection, test or request for approval. The contractor shall bear all costs of such inspections, tests or approvals except for code inspections as stated in 4.5.6. All tests must be recorded by the contractor and records made available to the University and/or University’s project manager upon request.

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4.13.5 The contractor shall acquire inspection or testing services using only those firms/entities preapproved by the University. Failure to use a firm/entity preapproved by the University shall be grounds for rejection of the inspection or test as non-conformance.

4.13.6 In addition to the above, the contractor agrees to insert in all contracts/purchase orders for inspection and testing the requirement for the inspection or testing firm/entity to submit, in conjunction with the report to the contractor, a copy of the report directly to the University’s project manager or contracting officer. The copy shall be held pending receipt of the contractor’s certification of the report. Further, the contractor agrees to require all reports be submitted within fourteen (14) calendar days of the test or inspection. Failure to provide reports within the required time shall be addressed pursuant to Article 10.3.9 of the general conditions.

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4.14 EQUIPMENT - MATERIAL

4.14.1 The contractor warrants to the University, the contracting officer, University’s project manager and Architect/Engineer that all materials and equipment furnished under the contract will be new, unless otherwise specified, and that all work will be of good quality, free from defects, faults and in conformance with the contract documents. All work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective and rejected by the contracting officer, the University’s project manager or the Architect/Engineer. If required by the University’s project manager, Architect/Engineer or the contracting officer, the contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. This warranty is not limited by the provisions of the other paragraphs contained herein.

4.14.2 The contractor shall furnish and deliver the necessary equipment and materials in ample quantities and as frequently as required to avoid delay in progress of the work and shall store same so as not to cause interference with the orderly progress of the project.

4.14.3 The contractor shall furnish and pay for all necessary transportation, storage, scaffolding, centering, forms, water, labor, tools, light and power mechanical appliances and all other means, materials and supplies for properly prosecuting the work under this contract unless expressly specified otherwise. The contractor shall make arrangements to have representatives of his/her firm at the site to accept delivered materials. The University will not be held responsible for damage, theft or disappearance of the contractor's property. In receiving and storing equipment and material, the contractor shall be responsible for OSHA requirements for the entire project including OSHA requirements for temporary access to all floors.

4.14.4 Whenever available, manufactured products of the United States shall be used in this work. Wherever practicable, preference shall be given at all times to material and equipment manufactured or produced in the State of New Jersey where such preference is reasonable and will best serve the interest of the University.

4.14.5 No materials, equipment or supplies for the work shall be purchased by the contractor or any sub-contractor subject to any lien or encumbrance or other agreement by which an interest is retained by the seller. By signing his/her requisition for payment, the contractor warrants that he/she has good and sufficient title to all such material, equipment and supplies used by him/her in the work, free from all liens, claims and encumbrances.

4.15 SUBSTITUTIONS

4.15.1 The contract documents are intended to produce a building of consistent character and quality of design. All components of the building, including visible items of mechanical and electrical equipment, have been selected to have a coordinated design in relation to the overall appearance of the building. The Architect/Engineer 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/Engineer will not approve as equal to materials specified proposed substitutes which, in the Architect's/Engineer's sole opinion, would be out of character, obtrusive or otherwise inconsistent with the character or quality of design of the project. In order to permit coordinated design of color and finishes, the contractor shall, if required by the Architect/Engineer, furnish the substituted material in any color, finish, texture or pattern which would have been available from the manufacturer originally specified at no additional cost to the owner.

4.15.2 In the event the contractor should propose a substitution for the specified equipment or materials, it shall be his/her responsibility to submit proof of equality and to provide and pay for any tests which may be required by the contracting officer, the University's project manager or Architect/Engineer in order to evaluate such proposed substitution.

4.15.3 Where any particular brand or manufactured article is specified, it shall be regarded as a standard. Similar products of other manufacturers, capable of equal performance and quality in the opinion of the contracting officer, will be accepted, if approved.

4.15.4 There shall be no extension of time to the project schedule granted to accommodate the requirements of this Article 4.15. Substitutions and/or any testing, etc. required to be done by the contractor to have the substitution approved will be done within the approved project schedule timeframe.

4.15.5 The application for approval of a substitution by the contractor shall include the following information:

a) identifying information shall be fully and completely furnished
b) note whether the item is included in the specifications in which case, identify the specification paragraph and section
c) attach data indicating, in detail, whether and how the substitution differs, if at all, from the article specified
d) if a credit is to be offered for the substitution, a detailed itemization of the amount of credit must be shown
e) if the proposed substitution involves a change in the scope of the work of this or any other contractor or trade under the contract documents, then and, in that event, the contractor undertakes and agrees to be responsible for any and all added costs and thereby involved by reason of the change in the work, including redesign if any
f) when requesting approval of an out-of-state sub-contractor or material manufacturer or supplier, a statement indicating that reasonable effort was first made to find and employ New Jersey firms and/or materials at comparable costs, term and performance capabilities
g) an agreement by the contractor to submit proof of equality and to have such tests performed at his/her own expense as may be required by the contracting officer or the Architect/Engineer
h) the contractor shall not base his/her bid on substitutions, which may have been approved on previous projects; bids shall be based solely on plans and specifications of the subject project

Since substitutions are primarily for the financial benefit of the contractor, a credit change order shall accompany each request for substitution.

4.16 SUB-CONTRACTOR APPROVALS

4.16.1 Approval by the contracting officer, University's project manager or Architect/Engineer of a sub-contractor or material supplier shall not relieve the contractor of the responsibility for complying with all provisions of the contract documents. The approval of a sub-contractor does not imply approval of any material, equipment or supplies.

4.16.2 The contractor shall coordinate and supervise the work performed by sub-contractors to the end that the work is carried out without conflict between trades and so that no delay to the general progress of the work occurs. The contractor and all sub-contractors shall afford each trade, any separate contractor or the owner every reasonable opportunity for the installation of work and the storage of materials at all times.

4.17 PAY LIMITS FOR ADDITIONS OR DEDUCTIONS FOR EXCAVATION

4.17.1 The method of measurement and establishment of pay limits for additions or deductions for excavation shall be as follows:

a) Basement Excavations: Pay limit for excavation shall be determined by horizontal and sloped lines as defined on the foundation plan and "typical subsoils preparation details": In the case where the contract limit line is in close proximity to the building and sheeting/shoring are required, the vertical line of sheeting will be the pay limit line

b) All Pipelines and Encased Utilities: pay limit for trench excavations shall be limited to width of thirty-six inches (36") or the largest diameter of pipe barrel plus twenty-four inches (24"), whichever is greatest, and depth at bottom of pipe barrel; when rock is encountered, the contractor shall excavate to six inches (6") below bottom of pipe barrel; a compacted granular fill for the pipe shall be provided by the contractor; no additional payment will be made for this additional six inches (6") of granular fill

c) Encased Electrical Conduit, Steam Transmission Lines and Unformed Foundation Footing: width and depth of trench shall be limited to same width and elevations of the structure shown on the contract drawings

d) Unsuitable Foundation Material: where unsuitable foundation material is encountered, the contractor shall excavate to elevations as directed by the contracting officer through the University's project manager; unit prices for additional excavation and replacement with approved compacted granular fill, stated in the proposal form, shall be used as a basis for additional payment by the University; in the event that no unit price is included in the
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Proposal form, the unit prices shall be negotiated with the contracting officer through the University’s project manager prior to performance of the work or, at the option of the contracting officer, shall be done on a time and material basis plus ten percent (10%) profit; the decision setting unit prices shall be made by the contracting officer.

4.18 SOIL BORINGS (IF APPLICABLE)

4.18.1 The University may possess geotechnical reports. Any geotechnical report/reports is/are included in the project manual for informational purposes only. The University is in no way responsible for, nor does it warrant, the data contained in the report(s) or the methods utilized in their preparation. Bidders will be granted access to the site to conduct their own tests upon request. The contractor assumes full responsibility for interpretation of any borings and the University shall have no responsibility or liability should the data provided prove to be incorrect or unrepresentative. All the provisions of paragraph 4.1.1 shall also apply hereto.

4.19 COORDINATION OF WORK

4.19.1 The contractor shall be responsible for coordinating all work performed upon the project as follows:

a) the contractor shall be responsible for all arrangements for the storage of materials
b) the contractor shall keep informed of the progress and the details of work of his/her sub-contractors and shall notify the University’s project manager immediately of lack of progress or defective workmanship on the part of sub-contractors; the contractor shall provide scheduling updates at the bi-weekly project meetings

4.19.2 The contractor shall refer to all of the drawings including those showing primarily the work of the mechanical, electrical or other specialized trades and to all of the sections of the specifications and shall perform all work reasonably inferable therefrom as being necessary to produce the indicated results. The contractor shall insure that all of his/her sub-contractors are fully familiar with their obligations to the contractor in his/her performance of the contract.

4.19.3 This project as described by these specifications and accompanying drawings is bid under a single prime contract as mandated by 1B1.2 of the instructions to bidders. However, this section will apply to work relating to this project and not described herein as part of this project.
4.20 PROTECTION OF CONTRACTOR’S PROPERTY

4.20.1 The contractor shall adequately secure and protect his/her own tools, equipment, materials and supplies. The University assumes no liability for any damage, theft or negligent injury to the contractor's property or to the property of his/her employees, agents or sub-contractors.

4.21 PATENTS

4.21.1 The contractor shall hold and save the University and its officers, agents, servants and employees harmless from liability of any nature or kind, including costs and expenses for or on account of any patented or unpatented invention, process, article or appliance manufactured or used in the performance of the contract, including its use by the University, unless otherwise specifically stipulated in the contract documents.

4.21.2 License and/or royalty fees for the use of a process, which is authorized by the University, must be reasonable and paid to the holder of the patent or his/her authorized licensee directly by the University and not by or through the contractor. If the contractor uses any design, device or materials covered by letters, patent or copyright, he/she shall provide for such use by suitable agreement with the University of such patented or copyrighted design, device or material. It is mutually agreed and understood that, without exception, the contract prices shall include all royalties or costs arising from the use of such design, device or materials in any way involved in the work. The contractor and/or his/her sureties shall indemnify and save harmless the University from any and all claims for infringement by reason of the use of such patented or copyrighted design, device or materials or any trademark or copyright in connection with work agreed to be performed under this contract and shall indemnify the University for any cost, expense or damage which it may be obliged to pay by reason of such infringement at any time during the prosecution of the work or after completion of the work.

4.22 RIGHT TO AUDIT

4.22.1 The University reserves the right to audit the records of the contractor in connection with all matters related to this contract. The contractor agrees to maintain his/her records in accordance with generally accepted accounting principles for a period of not less than three (3) years after receipt of final payment.

Accounting records must identify all labor and material, costs and expenses whether they be direct or indirect. The identification must include at least the project number for direct expenses and/or account number for indirect expenses. All charges must be supported by appropriate documentation including, but not limited to, canceled checks.

4.22.2 The contractor shall develop, maintain and make available to the contracting officer upon request such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, change orders, all original estimates, take-offs and other bidding
documents, all sub-contractors and supplier contracts and changes, all records showing all costs and liabilities incurred or to be incurred in connection with the project including all sub-contractor and supplier costs, all payment records and all records incurred in labor and personnel of any kind, records and other data as the University may request concerning work to be performed under this contract.

4.22.3 The contractor acknowledges and agrees that no claim for payment, which is premised, to any degree upon actual costs of the contractor shall be recognized by the University except and to the extent that such actual costs are substantiated by records required to be maintained under these provisions.

4.22.4 The contractor acknowledges and agrees that the contractor's obligation to establish, maintain and make available records and the University's right to audit as delineated herein shall extend to actual costs incurred by sub-contractors in performing work required under the contract or any supplemental agreement thereto.

4.23 CONTROL WIRING

4.23.1 The contractor shall include in his/her proposal the cost of all control wiring and its installation for all mechanical equipment including, but not limited to, heating, ventilating and air conditioning systems, ATC systems, boilers, remote monitoring systems, etc. which systems require electrical control wiring. The contractor shall employ a sub-contractor approved by the University for all such control wiring. The sub-contractor shall provide a final certificate of electrical inspection of the control wiring.

Installed or control wiring must connect to a point of electrical power supply as shown on the contract documents.

4.24 STAND-BY PERSONNEL

4.24.1 The contractor, when obligated to employ stand-by personnel by trade agreement to which he/she is a party, shall determine and include all such costs thereof in his/her bid proposal. The contractor shall not, at any time, make a claim to the University for costs relating to stand-by maintenance or stand-by supervision for electric motor driven or other equipment. The University, under no condition, will entertain or consider a claim in this regard unless such claim is made as a result of the University's unreasonable refusal to accept beneficial occupancy of the completed project.

ARTICLE 5 - CONTRACTOR FOR GENERAL CONSTRUCTION; SPECIAL RESPONSIBILITIES

Whenever the term "general construction contractor" is used herein, it is intended to mean either the contractor for general construction whenever separate prime contracts are involved or the sole contractor if there are no other prime contracts engaged on the project.

5.1 UNIQUE ROLE OF RESPONSIBILITY-STAFFING
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5.1.1 Wherever separate contracts are awarded to separate prime contractors for different branches of the work or where there is a single prime contractor, the contractor for general construction, hereinafter referred to as the general construction contractor, has the responsibility for being the supervisor, manager, overseer, coordinator and expeditor of all the contractors and/or sub-contractors and/or of the total construction process and of its parts in accordance with the contract documents.

5.2 CONTRACTING OFFICER'S RELIANCE UPON CONTRACTOR FOR GENERAL CONSTRUCTION

5.2.1 The contracting officer relies upon the organization, management, skills, cooperation and efficiency of the general construction contractor to supervise, direct, control and manage the work so as to deliver the completed project in conformance with the contract documents and within the scheduled time.

5.2.2 The contractor for general construction shall include in his/her bid an amount sufficient to cover his/her cost of furnishing necessary administrative and supervisory forces to coordinate his/her own work and that of his/her sub-contractors and other primary contractors.

5.3 LAYOUT, DIMENSIONAL CONTROL AND VERIFICATION, SURVEYOR'S CERTIFICATION

5.3.1 The general construction contractor shall be responsible for locating and laying out the building of all of its parts of the site in strict accordance with the drawings and shall accurately establish and maintain dimensional control. He/she shall employ and pay for the services of a competent and licensed New Jersey engineer or land surveyor hereinafter Contractor's Engineer or Surveyor who shall be approved by the University to perform all layout work and to test the levels of excavations, footing base plates, columns, walls and floors and roof lines and furnish to the University's project manager as the work progresses certificates that each of such levels as is required by the drawings is met. The plumb lines of walls, etc. shall be tested and certified by the surveyor as the work progresses.

5.3.2 The Contractor's engineer or surveyor, in his/her layout work both on the site and within the building shall establish all points, lines, elevations, grades and bench marks for proper control and execution of the work. He/she shall establish a single permanent benchmark as directed to which all three (3) coordinates of dimensional control shall be referred. He/she shall verify all University furnished topographical and utility survey data and all points, lines, elevations, grades and benchmarks. Should any discrepancies be found between information given on the drawings and the actual site or field conditions, the general contractor shall notify the University's project manager of such discrepancy and shall not proceed with any work affected until receipt of written instructions from the University's project manager.

5.3.3 Maintenance of Construction Access Routes: The general construction contractor shall be responsible for providing and maintaining unobstructed traffic lanes on the designed construction access routes either shown on the contract drawings or
reasonably required so as to perform the work and shall provide and maintain all reasonably required safety devices. He/she shall provide the addition of materials, their grading and compaction, the removal of snow and debris so as to provide and maintain the general, serviceable condition of the access roadbed as well as pedestrian walkways.

5.3.4 Project Sign: The general construction contractor shall erect and maintain one (1) sign at the project site as shown on the drawings and located as directed by the University’s project manager. Painting shall be done by a professional sign painter with two (2) coats of exterior paint, colors, letter face and layout as shown. No other signs will be permitted at the site. Upon completion of the project and when directed by the University’s project manager or the University, the general construction contractor shall remove the sign. Should there be a change in the listed officials, the contractor shall make appropriate changes to the sign at his/her expense. Sign is to be six feet by ten feet (6’ x 10’) to include, at a minimum, the information shown on the drawing title sheet. Additional information will be as directed by the owner.

5.3.5 The general construction contractor, at his/her expenses, shall provide and maintain necessary temporary dustproof partitions or other necessary protection around areas of work in any existing building or in new building areas as directed by the University’s project manager or the contracting officer.

5.3.6 The contractor shall supply dumpster for trash, trash chutes, all debris, clean-up and all temporary fire protection per OSHA requirements.

5.3.7 Repair of Cracks: The general contractor accepts sole responsibility for repair of uncontrolled dislodgement, cracking, delaminating and peeling of finished surfaces, such as, concrete, precast concrete, case and natural stone; until masonry, millwork, plaster, glass and applied finishes; such as, paint and special coatings; within the contract scope and the limits of specified guarantee periods regardless of the cause.

5.3.8 The general construction contractor shall be responsible for replacement of all broken glass installed by him/her or his/her sub-contractors after same has been installed no matter by whom or what caused same and shall replace all broken, scratched or otherwise damaged glass before the completion and acceptance of the work or as required pursuant to any applicable warranty. He/she shall wash all glass on both sides when directed by University’s project manager and at completion of the Project, removing all paint spots, stains, plaster, etc.

5.3.9 Nothing herein is intended to limit the right of the contractor to seek payment from the party who is responsible for the damages.

5.4 PHOTOGRAPHS

5.4.1 With each monthly application for payment the general contractor shall submit progress photographs of the building in duplicate to the University’s project manager, giving four (4) views of each area photographed as selected by the
5.4.2 The photographs shall be eight inches by ten inches (8" x 10"). Two (2) copies and color photos shall bear a caption stating the date of the exposure and the name of the project, the contractor, the Architect/Engineer and the University's project manager.

5.5 GUARANTEE

5.5.1 Neither the final certification of payment nor any provision in the contract documents nor partial or entire occupancy of the premises by the University shall constitute an acceptance of work not done in accordance with the contract documents nor shall it relieve the contractor of liability with respect to any expressed or implied warranties or responsibility for faulty materials or workmanship. The University will give notice of observed defects with reasonable promptness. The surety's obligation shall continue beyond final acceptance to the extent that the contractor would have had such obligation.

5.5.2 In addition to guarantees otherwise specified in other sections of the specifications, the contractor and each individual sub-contractor shall guarantee and warrant, in writing, the work to be performed and all materials to be furnished under this contract against the defects in materials or workmanship and to pay for the value of repair of any damage to other work resulting there from for a period of one (1) year from the date of Final Acceptance. All guarantees, bonds, etc. required by the specifications shall be in writing in requisite legal form and delivered to the contracting officer at the time of submission of the requisition for final payment. All sub-contractor's guarantees, bonds, etc. shall be underwritten by the contractor who shall obtain and deliver same to the contracting officer before the work shall be deemed finished and accepted.

5.5.3 The contractor shall, at his/her own expense and without cost to the University within a reasonable time after receipt of written notice thereof, make good any defects in material or workmanship which may develop during stipulated guarantee periods as well as any damage to other work caused by such defects or by their repairs. Any other defects in material or workmanship not reasonably observable or discovered during the guarantee period shall be repaired and/or replaced at the contractor's expense and such shall be completed within a reasonable time after written notice is given to the contractor.

5.5.4 It is anticipated that certain permanent equipment will have to be activated during construction of the project to support construction operations. This would particularly be the case with respect to service elevators and those portions of the permanent heating system, which might be required to provide temporary heat for interior, finish operations. Regardless of when equipment is activated for use during construction, all equipment warranties must extend for the time periods required in these specifications starting as of the date of Final Acceptance, of the project by the University. The contractor shall include in his/her base bid all costs necessary to provide extended warranties as necessary for any equipment, which may be
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activated prior to final building acceptance by the University.

5.6 INSPECTION OF ROADWAY SUB-GRADES

5.6.1 Where applicable, the general construction contractor shall notify the University's project manager forty-eight (48) hours prior to anticipated completion of all roadway sub-grade work. The University's project manager may request an inspection by an appropriate agency to insure that the sub-grade meets the compaction standards. All sub-grades shall be proof-rolled for such inspection. If compaction soil tests are required, these tests will be done by soils testing laboratories through the contractor unless contrary provisions are made elsewhere in the specifications. The contractor shall not proceed with base course until the results of the compaction tests are determined and upgrade approved by the University's project manager.

5.7 WATCHMAN SERVICES

5.7.1 The general construction contractor shall provide watchman services to adequately protect the work, stored materials and temporary structures located on the premises and to prevent unauthorized persons from entering upon the construction site. The University or the University's project manager may require the general construction contractor to increase the watchman services in terms of hours or number of watchman, at no cost to the University, in the event that the University and/or University's project manager determine that the watchman services are not sufficient.

ARTICLE 6 - TEMPORARY FACILITIES, UTILITIES AND SERVICES

Whenever the term "general construction contractor" is used herein, it is intended to mean either the contractor for general construction whenever separate prime contracts are involved or the sole contractor if there are no other prime contracts engaged on the project.

6.1 FIELD OFFICES

6.1.1 The contractor will provide on-site and maintain during the project construction a suitable weather-tight insulated field office conveniently located for reception and continuous use and shall maintain therein a complete set of contract documents including plans, specifications, CPM schedules, change orders, logs and other details and correspondence. The field office shall contain approved and safe heating facilities and lighting, convenience outlets, fire extinguisher, a minimum of two (2) operating windows CIF 15 S.F. each, outside door, handle, hasp and padlock.

6.1.2 Deleted

6.1.3 Deleted

6.1.4 The contractor shall provide his/her own telephones. The general construction
contractor shall provide a coin operated pay telephone for use by all workers on the construction site.

6.2 STORAGE SHEDS, TOOL SHEDS, SHOPS AND EMPLOYEESHEDS

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6.3 STORAGE AREAS, EMPLOYEE VEHICULAR PARKING, EQUIPMENT MARSHALLING AREAS, EXCAVATION BORROW/SPOILS DESIGNATED AREAS, COMMERCIAL CANTEEN AREA, ETC.

6.3.1 The contractor shall be responsible for providing his/her own requirements. He/she shall locate these areas to suit project requirements as indicated in the contract documents with the University’s project manager’s concurrence.

6.4 TEMPORARY TOILET FACILITIES

6.4.1 The contractor shall provide and pay for suitable temporary toilets at an approved location approved by the University’s project manager on the site prior to the start of any fieldwork. They shall comply with all Federal, State and local laws. The contractor will be responsible for maintenance, removal and relocation as described hereinafter.

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6.4.10 Workman are not to use the finish bathroom and toilet facilities in the project buildings. Reasonable steps must be taken by the general construction contractor to enforce this rule.

6.5 TEMPORARY DRIVES AND WALKS

6.5.1 The general construction contractor shall be responsible for keeping all roadways, drives and parking areas within or proximate to the site free and clear of debris, gravel, mud or any other site materials by insuring that all measures reasonably
necessary are taken to prevent such materials from being deposited on such surfaces including, as may be appropriate, the cleaning of vehicle wheels, etc. prior to their leaving the construction site. Should such surface require cleaning, the general construction contractor will clean these surfaces without additional cost to the University. The general construction contractor will be held accountable for any citations, fines or penalties imposed on the University for failing to comply with local rules and regulations.

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6.5.3 The general construction contractor shall obtain permission, in writing, from the University’s project manager before using any existing driveways or parking areas not specifically designated for such use in the contract documents for construction purposes. He/she shall maintain such driveways and areas in good condition during the construction period and, at completion of the project, shall repair or replace said driveway or areas in a manner acceptable to the University. Conditions before use should be carefully photographed or documented by the contractor and a copy provided to the University prior to the commencement of work.

6.6 TEMPORARY WATER

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6.6.2 It is the obligation of the contractor requiring temporary facilities to investigate and make specific arrangements with the University through the University’s project manager for such facilities and to include in his/her proposal the cost of any facilities he/she may require for proper conduct of his/her work.

6.6.3 The contractor shall install his/her temporary and/or permanent water lines to the boiler room and heating equipment in sufficient time to be available for supplying water for testing and operation on the heating system when needed to supply heat on the project.

6.6.4 The contractor is responsible to protect all water lines from damage or freezing be they permanent or temporary. Should water connections be made to an existing line, the contractor shall provide a positive shut-off valve at his/her cost and expense.

6.6.5 If the contractor fails to carry out his/her responsibility in supplying the water as set forth herein, he/she shall be held responsible for such failure and the University’s project manager shall have the right to take such action as he/she deems proper for the protection and conduct of the work and may deduct the cost involved in so doing from any sums due to the contractor.

6.7 TEMPORARY LIGHT AND POWER

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6.7.4 If applicable and necessary, the contractor shall provide all electrical service for operation of elevator equipment during construction as well as for permanent installation.

6.7.5 The contractor shall pay for the cost of all electric energy used on distribution lines installed until the project is accepted by the University.

6.7.6 The contractor shall provide and pay for all maintenance, servicing, operating and supervision of the service and distribution facilities. He/she shall also connect, maintain and service any electrical equipment which may be necessary for maintaining heat whenever heat is required in the building whether from the temporary or permanent system.

6.7.7 The contractor failing to carry out his/her responsibility in supplying uninterrupted light and power or other utility as set forth in the construction documents shall be held responsible for such failure and the University’s project manager shall have the right to take such action as he/she deems proper for the protection and conduct of the work and shall deduct the costs involved from the amount due the contractor at fault.

6.7.8 There shall be no additional cost to the University because of stand-by requirements due to conflict in the normal working hours of trades. Where overtime work by the contractor necessitates stand-by electricians or other trades, the contractor shall be responsible for making appropriate arrangements, financial and otherwise, for such service at no cost to the University.

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6.9 TEMPORARY HEAT

6.9.1 Maintenance and safe operation of the temporary heating system and equipment shall be the responsibility of the Contractor. Any liability arising out of damage or injury resulting from the use or operation of heating equipment by the Contractor, sub-contractors, equipment and material suppliers, consultants, agents of any of them and anyone employed either directly or indirectly by any of them or anyone for whose acts they may be liable shall be the sole responsibility of the Contractor.

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6.9.9 On the (60th) calendar day after the building, buildings or major unit thereof is/are permanently enclosed & the contracting officer has determined that heat is required for the proper execution of the construction work, the contractor shall continue to provide heat. A building or major unit thereof shall be considered "permanently enclosed" when (a) the exterior & enclosure work including walls, windows, glazing, louvers and doors have been permanently installed; (b) a permanent building roof has been completed & satisfactorily tested; (c) the permanent building roof drain system has been completed and made operational; (d) all building openings have been closed such that the building is weather tight. Regardless of whether the boiler room is within the confines of the major unit or not, it must be enclosed & the floor installed at least sixty (60) calendar days prior to the time when the contractor becomes responsible to supply heat.

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6.9.12 The University reserves the right to permit the substitution of limited, temporary enclosures in lieu of permanent construction for the attainment of a permanently tight building if such action is deemed to be in the best interest of the project by the University's project manager. This action will not be such as to create a future jeopardy to the environmental integrity of the building as construction proceeds.

6.9.13 When the permanent heating system is the source of the heat, the contractor shall be responsible for paying all water, electricity and fuel required for the operation of the permanent heating system until beneficial occupancy acceptance of the project by the University except for the cost of fuel during the test period as previously provided. The contractor shall install adequate controls and shall arrange, at his/her own cost, for making such temporary connection as required for the operation of the heating system. Should the heating system be designed for the tie-in to existing steam lines for source of heat, the University will provide steam for temporary heat through the project permanent heating system at no cost to the contractor after tie-in is completed.

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6.9.15 Valves, traps and other parts of the heating system, except air filters, which are permanently installed by the contractor and used for supplying heat during the
construction period, need not be replaced, provided that the system was in acceptable condition prior to its use and was properly maintained. The system shall be properly cleaned and adjusted to operate after the permanent system is in use. Seven (7) days prior to acceptance by the University of the heating system as substantially complete, the contractor shall replace disposable filters with clean filters of the type specified or turn over spare sets of filters to the University as directed by the Construction Manager.

6.9.16 If plastering, parging or finishing of any surface is necessary to enable the contractor to install the heating system in a manner as to permit its use for supplying heat during the construction period, the plastering, parging and finishing of such surfaces shall be done by the contractor so as not to delay the installation of the permanent system. In the event this plastering, parging or other finishing work is not completed in ample time to make possible the installation of permanent piping and heating units, the contractor shall install temporary/primary heating units. The cost of such temporary installation and its removal shall be paid by the contractor.

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6.9.18 If additional heat is required beyond that specified in the contract documents, the contractor should arrange and pay the additional costs thereof at no expense to the University.

6.9.19 The Contractor shall provide a cost to supply heat in accordance with all requirements of this Section and Division 1; General Requirements, Section 01500 of the Specifications.

6.10 TEMPORARY ENCLOSURES

6.10.1 Whenever necessary in order to maintain proper temperatures for the prosecution of the work or for the protection thereof, the contractor shall furnish and maintain temporary enclosures for all openings in exterior walls which are not enclosed with finishing materials. Temporary wood doors shall be provided at door openings.

6.11 TEMPORARY CONSTRUCTION FENCE AND SIGNAGE

6.11.1 As required by the University's project manager, the contractor shall provide and maintain an eight foot (8') high temporary chain link fence with necessary posts and top rails to enclose the area at the job site and to guard and close effectively the designated area. The contractor shall be responsible for posting appropriate signage restricting access and shall further be responsible for controlling access to the job site. The contractor shall provide gates at locations where required for access to the enclosed area. Gates shall be of chain link material, cross-braced, hung on heavy strap hinges and shall have suitable hasps and padlocks.

6.11.2 The contractor shall remove the fence upon completion of the work or at such time before final completion as directed by the University.
6.12  EDGE PROTECTION

6.12.1  The contractor shall be responsible for proper protection for all floor, roof and stair penetrations.

ARTICLE 7 - SUB-CONTRACTORS

7.1  CONTRACTOR/SUB-CONTRACTOR RELATIONSHIP

7.1.1  As provided in other sections of the Contract Documents after award of the contract, the contractor shall notify the contracting officer through the University's project manager in writing of the names of sub-contractors, other than those required to be listed in the bid, proposed to perform the principal parts of the work and of such others as the contracting officer may direct and shall not employ any sub-contractor without prior, written approval of the contracting officer or any that the contracting officer may, within a reasonable time, reject. Failure of the contracting officer to reply within fifteen (15) days upon receipt of such names shall constitute notice of approval.

7.1.2  If the contracting officer has a reasonable objection to any such proposed person or firm, the contractor shall substitute another sub-contractor to which the contracting officer has no reasonable objection. Under no circumstances shall the University be obligated for additional cost due to such substitution.

7.1.3  The contractor shall make no substitution for any sub-contractor, person or firm previously selected and approved without written notification to the contracting officer and receipt of his/her written approval for such substitution.

7.1.4  The contractor acknowledges his/her full responsibility to the University for all acts and omissions of his/her sub-contractors and of persons and firms either directly or indirectly employed by them equally to the extent that he/she is responsible for the acts and omissions of persons and firms directly or indirectly employed by him/her and the contractor acknowledges he/she remains fully responsible for the proper performance of his/her contract irrespective of whether work is performed by his/her own forces or sub-contractors engaged by him/her.

7.1.5  Nothing contained in the contract documents shall create any contractual relationship between any sub-contractor and the University.

7.1.6  By an appropriate written agreement the contractor shall require each sub-contractor, to the extent of the work performed by the sub-contractor, to be bound to the contractor by the terms of the contract documents and to assume toward the contractor all the obligations and responsibilities which the contractor, by these documents, assumes toward the University, the contracting officer, the University’s project manager and the Architect/Engineer. The contractor shall require each sub-contractor to enter into similar agreement with his/her sub-sub-contractors.

7.1.7  The contractor and all sub-contractors agree that, in the employment of both skilled
and unskilled labor, preference shall be given to residents of the State of New Jersey if such labor force is available.

7.1.8 Approval by the contracting officer, the University's project manager or Architect/Engineer of a sub-contractor or material supplier shall not relieve the contractor, the sub-contractor or material supplier of the responsibility of complying with all provisions of the contract documents. The approval of a sub-contractor does not imply approval of any material, equipment or supplies.

7.1.9 The contractor shall coordinate and supervise the work performed by sub-contractors to the end that the work is carried out without conflict between trades and so that no delay to the general progress of the work occurs. The contractor and all sub-contractors shall afford each trade, any separate contractor or the owner every reasonable opportunity for the installation of work and the storage of materials at all times.

7.1.10 The contractor shall require each sub-contractor to the extent of the work to be performed by the sub-contractor to be bound to the contractor to the terms of the University contract documents and to assume toward the contractor all the obligations and responsibilities which the contractor assumes by the documents to the University and its contractual parties.

7.1.11 The contractor shall not grant to any sub-contractor terms more favorable than those extended to the contractor by the University.

7.1.12 The contractor shall not permit his/her sub-contractor to perform sub-contract work without the express written approval of the contracting officer through the University’s project manager.

7.1.13 The contractor shall be required in all sub-contracts that the sub-contractor establish, maintain and make available to the University all records as defined and delineated herein related to all work performed under the subcontracts including work performed by a sub-contractor.

ARTICLE 8 - RELATIONSHIP BETWEEN UNIVERSITY/CONTRACTOR

8.1 UNIVERSITY’S RIGHT TO PERFORM WORK

8.1.1 The University may and reserves the right to enter upon the premises at any and all times during the progress of the work or cause others to do so for the purpose of installing any apparatus or carrying on any construction not included in these specifications or for any other reasonable purpose.

8.1.2 The contractor shall examine all work or materials installed by other contractors and/or sub-contractors, the installation of which may affect the work in his/her contract, and should the same be imperfect, incorrect or insecure, he/she shall notify the contracting officer immediately in order that same be rectified. The
contracting officer shall be responsible for instructing the contractor as to what corrective action is required of the contractor.

8.2 MUTUAL RESPONSIBILITY

8.2.1 The contractor shall afford the University, the University’s project manager and all sub-contractors reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work. The contractor shall coordinate all work with adjacent work with all trades so that no portion of the work is delayed or not properly undertaken due to lack or failure of cooperation.

8.2.2 The contractor shall lay out and install his/her work at such time or times and in such manner as to be in compliance with the project schedule and so as to facilitate the general progress of the project.

8.2.3 Before completion of the work contemplated herein, should it be deemed necessary by the University to do any work whatsoever in or about the building or structure other than as provided for in the contract documents, the contractor shall fully cooperate with such other individual or firm as the University may employ to do such work so that such additional work may be performed without unreasonable interference. The contractor shall afford said other individual or firm all reasonable facilities for doing such work. The Contractor may not seek an extension of the Contract time as a result of such work. However, Contractor is not entitled to any additional compensation nor shall be entitled to maintain a claim for additional costs or damages as a result of such work.

8.2.4 The contracting officer or his/her University’s project manager, and Architect/Engineer shall have access to the work at all times whether it is in preparation or in progress and the contractor shall provide proper facilities for such access and for inspection. The contracting officer reserves the right at his/her option to employ the services of a professional consultant to evaluate any phase of the work he/she may deem to be in the best interest of the University but no evaluation performed shall in any way relieve the contractor of his/her responsibilities under the contract. The consultant's work product shall be confidential and shall not be disclosed to the contractor. The contractor shall cooperate with the consultant(s) and provide access to the work and facilities for inspection. Should any portion of the work or material be found deficient or defective, the contractor will pay the applicable fees of such consultant and be responsible for replacing the deficient or defective work as required by the provisions stated elsewhere herein. In the event that contractor is required to pay the applicable consultant fees, the contractor shall be entitled to a copy of the result of the consultant's investigation.

8.2.5 Any costs caused by defective or ill-timed work shall be borne by the party responsible therefore.

8.2.6 If the contractor should destroy, damage or disturb the work of any other contractor in or about the building or premises, the contractor shall immediately either replace
8.2.7 Should a contractor sustain any damage through any act or omission of any other contractor having a contract with the University or through any act or omission of the Architect/Engineer, the contractor shall have no claims against the University for such damage but shall have a right of action to recover such damages from the causing party or parties in accordance with 8.4.2 which is included in the contract with all other such contractors and the Architect/Engineer.

8.3 SUBSTANTIAL COMPLETION/FINAL COMPLETION

8.3.1 At the request of the University, the University’s project manager and/or the Architect/Engineer, the contractor and the University representative shall make a joint inspection of the work and, if all determine that the work is substantially completed, the University shall give notice of Substantial Completion for beneficial use. Such certification shall in no way relieve the contractor of any contractual obligation or in any way relieve the contractor from responsibility to promptly complete punch list work.

8.3.2 Use and Possession Prior to Completion: The University shall have the right to take possession of or use any complete or partially completed part of the work. Prior to such possession or use, the contracting officer shall furnish the contractor with an itemized list of work remaining to be performed or corrected on such portions of the project as are to be possessed or used by the University provided that failure to list any item of work shall not be deemed an acceptance of any work under the contract. While the University has such possession or use, the contractor, notwithstanding the provisions of the article of this contract entitled “Permits - Laws Regulations” shall be relieved of the responsibility for the loss or damage to the work resulting from University possession or use. If such prior possession or use by the University delays the progress of the work or causes additional expense to the contractor, an equitable adjustment in the contract amount will be made and the contract shall be modified in writing accordingly. Such an equitable adjustment of cost shall be the sole relief available to the contractor.

8.4 CONTRACTOR’S CLAIMS FOR DAMAGES

8.4.1 Any claims made by the contractor against the University for damages or extra costs are governed by and subject to the New Jersey Contractual Liability Act, N.J.S.A. 59:13-1 et.seq. as well as all the provisions in this contract.

8.4.2 Should any contractor, or Architect/Engineer having or who shall hereafter have a contract with the University, by his/her own acts, errors or omissions, damage or unnecessarily delay the work of the owner or other contractors by not properly cooperating with them or by not affording them reasonably sufficient opportunity or facility to perform work as may be specified by reason of which act, error or
omission of said contractor, the University’s project manager, the Architect/Engineer or any other contractor shall sustain damages including delay damages during the progress of work hereunder, then and in that event, the culpable party agrees to pay all costs and expenses incurred by the damaged contractor(s), the Architect/Engineer due to any such delays and/or damages whether by settlement, compromise mediation or arbitration and the injured contractor, Architect/Engineer shall have a right to redress enforcement in court directly against the culpable party. In addition, the culpable party further agrees to defend, indemnify and save harmless the University from all such claims and damages. Nothing contained in this paragraph shall be construed to relieve the culpable contractor, Architect/Engineer from any liability or damage sustained on account of such acts, errors or omissions.

8.4.3 The University shall not be liable to any contractor for any damages or extra costs caused by any acts or omissions of any person or entity except the University (as specified in this paragraph) and the contractor’s exclusive remedy shall be against the culpable party and not the University.

8.5 CONTRACTING OFFICER’S RIGHT TO ACCELERATE

8.5.1 The contracting officer may order and direct the contractor responsible for delay as described in 8.2.2 or, as may be apparent as a result of his/her observation of the work, to accelerate that contractor’s work at any particular place or places by increasing his/her forces, working overtime and/or on Saturdays, Sundays and holidays as may be required to enable others to carry on with their work in accordance with the project progress schedule. The cost of such acceleration efforts shall be borne entirely by the contractor and shall not be billed to the University.

8.6 TIME OF COMPLETION - DELAY - LIQUIDATED DAMAGES

8.6.1 In the event of the failure of the contractor to complete the said work within the time stated in the Bid Documents the contractor shall be liable to the University in the sum amount specified in Advertisement for Bids AND/OR the project manual front end per day for each and every calendar day that the said work shall be and remains uncompleted which sum shall be treated as liquidated damages, and not a penalty, for the loss to the University of the use of premises in a completed state of construction, alteration or repair, as the case may be, and for added administrative and inspection costs to the University on account of the delay provided, however, that the liquidated damages provided for herein shall be in addition to other consequential losses or damages that the University may incur by reason of such delay such as, but not limited to, added costs of the project and the cost of furnishing temporary services, if any. The University, from any monies due or to become due to the contractor, may deduct any such items for which the contractor is liable.

8.6.2 The contractor agrees that said work should be prosecuted regularly, diligently and uninterruptedly at such rate of progress as will insure full completion thereof within
the time specified. It is expressly understood and agreed by and between the contractor and the University that the time for the completion of the work herein is a reasonable time for the completion of same, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality. If the contractor shall neglect, fail or refuse to complete the work within the time herein specified then the contractor does hereby agree, as a part consideration for the awarding this contract, to pay the University the amount referred to in paragraph 8.6.1. Liquidated damages but not as a penalty.

8.6.3 The said amount is fixed and agreed upon by and between the contractor and the University because of the impracticality and the extreme difficulty of fixing and ascertaining of the actual damages the University would sustain in such event and said amount is agreed to be the amount of damages which the University would sustain.

8.6.4 It is further agreed that time is of the essence of each and every portion of this contract and of the specifications wherein a definite and certain length of time is fixed for the performance of any act whatsoever.

8.6.5 The contractor’s reasons for the time extension are listed below. Also the contractor shall not be charged with liquidated damages when the delay in the completion of the work is due to the following:

   a) to any preference, priority or allocation order duly issued by the government
   b) to unforeseeable cause beyond the control and without the fault or negligence of the contractor restricted to, acts of God except inclement weather or of the public enemy, fires, floods, epidemics, quarantine restrictions, freight embargoes; and
   c) to any delays of sub-contractors or suppliers occasioned by any of the causes specified in sub-sections (a) and (b) of this paragraph.

8.6.6 Delete

8.6.7 Payment of liquidated damages will not release Contractor from liability for damages sustained by other contractors as set forth in Section 8.4 hereto.

8.6.8 The University shall have the right to defer the beginning or to suspend the whole or any part of the work herein contracted to be done whenever, in the opinion of the contracting officer, it may be necessary or expedient for the University to do so.

8.6.9 The contractor shall not be entitled to any damages or extra compensation from the University on account of any work performed by the University, any other contractor, the Architect/Engineer, any other party or by reason of any delays whatsoever whether caused by the University or any other party including, but not limited to, the delays mentioned in this contract.

8.7 TIME OF COMPLETION – DELAY – OTHER COSTS
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8.7.1 In the event of the failure of the contractor to complete the said work within the time stated in the Bid Documents the contractor shall be liable to the University for all professional fees (i.e. Architect and any other consultants) and associated costs incurred by Rowan during the delay/extended construction duration. All additional professional fees will be deducted from the contractor's contract value via a credit change order. Professional fees and associated expenses are non-negotiable.

8.7.2 Other costs incurred by Rowan as a result of the contractor's failure to complete the said work within the time stated in the Bid Documents are not independent of any liquidated damages outlined within section 8.6 herein.

8.8 INDEMNIFICATION

8.8.1 The contractor shall assume all risk of and responsibility for and agrees to indemnify, defend and save harmless the University, the University's project manager and the Architect/Engineer, their employees, servants and agents, from and against any and all claims, demands, suits, actions, recoveries, judgments and costs and expenses in connection therewith on account of the loss of life, property, injury or damage to the person, body or property of any person or persons whatsoever resulting from the performance of the project or through the negligence of the contractor or any of his/her sub-contractors or through any improper or defective machinery, implements or appliances used by the contractor or his/her sub-contractors in the project or through any act or omission on the part of the contractor of his/her sub-contracts or his/her agents, employees or servants which shall arise from or result directly or indirectly from the work and/or materials supplied under this contract. This indemnification obligation is not limited by but is in addition to the insurance obligations contained in this agreement.

8.8.2 In any and all claims against the University, the Architect/Engineer or any of their agents or employees by any employees of the contractor, any sub-contractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this Article shall not be limited in any way as to the amount or type of damages, compensation or benefits payable by or for the contractor or any sub-contractor under worker's or workman's compensation acts, disability benefit acts or other employee benefit acts.

8.9 COMMENCEMENT OF WORK

8.9.1 The contract time shall commence on the date of receipt by the contractor of a written notice to proceed and/or University purchase order and/or fully executed University contract issued by the contracting officer. The above document(s) shall be promptly issued by the University. The contractor agrees that contract work shall commence no later than ten (10) calendar days after receipt of at least one of the documents listed above in this Section 8.9.1.

8.9.2 Provided the contract is not terminated pursuant to the paragraph contained within the Instructions to Bidders entitled "Contracts and Bonds", if, in the opinion of the contracting officer, the contractor's delay in furnishing financial responsibility and
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performance or payment bonds causes a delay in the issuance of any of the documents listed in Section 8.9.1 above, the time to complete the work as specified in the contract may be reduced to reflect such delay.

8.9.3 The contractor shall perform no work under this contract until the required evidence of financial responsibility, insurance and bonds has been furnished. Thereafter, work at other than the contract site may be undertaken. The contractor shall perform no work at the contract site except pursuant to a fully executed contract and/or purchase order.

8.9.4 The notice to proceed, contract and/or purchase order may be issued by the University at its convenience. The Contractor shall not be entitled to any additional compensation caused by any delay in issuing the issuance of the above mentioned documents. The Contractor's sole remedy shall be an extension of the scheduled final completion date in an amount equal to the length of the delay in issuing the contract, purchase order and/or Notice to Proceed.

ARTICLE 9 - CONSTRUCTION PROGRESS

9.1 Deleted

9.1.1 Deleted

9.2 CONSTRUCTION PROGRESS SCHEDULE

9.2.1 This Project shall be completed within the specified number of calendar days from the earlier of the date of the Notice to Proceed, the Purchase Order and/or the Contract.

9.2.2 The project shall be monitored by detailed scheduling system. This system shall be the basis for the evaluation of all contractors' performance.

a) The contractor, upon its completion of a project schedule as defined in this section, agrees that the project network schedule is the designated plan for completion of all work in the allotted time and the contractor will assume full responsibility for the prosecution of the work shown. The University shall indicate formal acceptance of the contractors schedule by signing the finalized schedule.

b) The contractor shall furnish sufficient labor, materials and equipment to insure the prosecution of the work in accordance with the approved schedule. If, in the opinion of the contracting officer and/or the University project manager, the contractor falls behind the approved schedule, the contractor shall take such steps as may be necessary to improve his/her progress and the contracting officer may require him/her to increase the number of shifts, days of work and/or the amount of materials and equipment, all without additional cost to the University and as provided in section 8.5.1.

9.2.3 Initial Submittal: The initial schedule, which is submitted to the University by the
contractor, shall show a coordinated plan for work for the contractor thereby providing a common basis of acceptance, understanding and communication.

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9.2.5 The schedule shall accurately reflect the manner in which the contractor intends to proceed with the project and shall incorporate the impact of all delays and change orders as soon as these factors can be defined. All changes made to the schedule shall be subject to approval by the University. If the contractor desires to revise the logic of the approved schedule so as to reflect a sequence of construction, which differed from that, originally agreed to, he/she must first obtain the approval of the University. If this change extends the completion date of the project or delays the work of other trades, the contractor agrees that these impacts and all associated costs will be considered a claim to be assessed against the contractor and will not be the basis for a project time extension.

9.2.6 Payments to the Contractor:

a) The submission of the computer produced calendar dated schedule shall be an integral part and basic element of the estimate upon which progress payments shall be made pursuant to the provisions of Article 10. The contractor shall be entitled to progress payments only upon receipt by the University of an updated computer produced calendar dated schedule as outlined in the contract documents.

b) Wherever required by the University’s project manager, the contractor shall provide sufficient documentation to confirm reported progress for any costed items appearing in the scheduling and requisition system; i.e., bills of lading for delivered materials and equipment, etc.

c) Payment to the contractor shall be dependent upon the contractor furnishing all of the information and data which, in the judgment of the University, is necessary to ascertain actual progress and all the information and data necessary to prepare any necessary revision to the computer produced calendar dated schedule and the network arrow diagram. The University's determination that the contractor has failed or refused to furnish the required information and data shall constitute a basis for withholding payment until the required information and data is furnished and the schedule and/or diagram is prepared or revised on the basis of such information and data.

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9.2.9 The contractor acknowledges and agrees that the evaluation of project delay will be based upon the project schedule and the following criteria:

a) float time shown on the schedule is not for the exclusive use of either the contractor or the University. It is agreed that float time is available for use by all parties to facilitate the effective use of available resources and to minimize the
impact of problems or change orders which may arise during construction. The contractor specifically agrees that the University or its representatives or consultants in conjunction with their review activities or to resolve project problems may use float time. The contractor agrees that there will be no basis for a project time extension as a result of any project problem, change order or delay which only results in the loss of available positive float on the project schedule. The contractor further agrees that there will be no basis for a claim for cost escalation for any activity which is completed on or before its initially required late end date as shown on the initially approved schedule regardless of the justification or any delaying factors which might have results in elimination of float which was originally available for the activity. If the contractor refuses to perform work which is available to them, the University's project manager or contracting officer may, regardless of the float shown to be available for the work, consider the contractor to be in violation of the contract documents. In such instances, the contracting officer may, without prejudice to any right or remedy and after giving the contractor and his/her surety three (3) working days written notice to forthwith commence and continue with the work with diligence and promptness, terminate the employment of the contractor by the issuance of a written notice to that effect to the contractor and his/her surety at any time subsequent to three (3) working days thereafter should they or either of them fail to comply with the directive of the original three (3) day notice mentioned above.

9.2.10 The final coordinated schedule shall be signed and dated by all Contractors and shall become part of the Contract Documents.

9.3 Each Contractor agrees that they will make no claim for, and have no right to, additional payment or extension of time for completion of the Work, or any other concession because of any misinterpretation or misunderstanding on its part of the Project Schedule, its failure to attend the pre-bid conference, or because of any failure on its part to fully acquaint itself with all conditions relating to the Project Schedule and the manner in which it will be used on the project or because of any other Contractor's failure to participate properly in the development of a schedule or to perform its contract in accordance with the schedule.

ARTICLE 10 - PAYMENTS

10.1 THE UNIVERSITY SHALL PAY THE CONTRACTOR THE CONTRACT PRICE AS HEREINAFTER PROVIDED

10.1.1 The University will make progress payments monthly as the work proceeds or at more frequent intervals as determined by the contracting officer on estimates approved by the contracting officer. Unless otherwise directed, the contractor shall furnish to the University’s project manager within two (2) weeks after a notice to proceed is issued to the contractor, a schedule of values for contract payments regarding labor and material breakdown of the total contract price showing the amount included therein for each principal category of the work in such detail as requested by the University. This schedule of values shall provide the basis for
determining progress payments. The schedule, as approved, shall be used only as a basis for the contractor’s estimates for progress payments and approval by the contracting officer does not constitute acceptance of the allocability of costs to a specific element of work. The contractor is cautioned that no payment requests shall be approved until the contracting officer or his/her University’s project manager has approved the schedule of values in writing. The contractor shall use the attachment to the G702 application for payment form.

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10.1.3 All material and work covered by progress payments made shall thereupon become the sole property of the University but this provision shall not be construed as relieving the contractor from the sole responsibility for the care and protection of all materials and work upon which payments have been made or the restoration of any damaged work or as waiving the right of the University to require the fulfillment of all of the terms and conditions of the contract.

10.1.4 If performance or payment bonds are required under this contract, the University shall pay the total premiums paid by the contractor to obtain the bonds to the contractor. This payment shall be paid at one time to the contractor together with the first progress payment unless otherwise due after the contractor has (1) furnish the bonds, including co-insurance and reinsurance agreements when applicable, (2) furnished evidence satisfactory to the University (such evidence being in the form of a receipt from the bonding company) of full payment to the surety company and (3) submitted a request for such payment. The payment by the University of the bond premiums to the contractor shall not be made as increments of the individual progress payments and shall be in addition to the contract price.

10.1.5 In addition to other warranties required by provisions of the contract and specifications, the contractor warrants that title to all work, materials and equipment covered by an application for payment will pass to the University, either upon incorporation into the construction or upon receipt of payment by the contractor, whichever occurs first, free and clear of all liens, claims, security interests and encumbrances. This provision shall not be construed as relieving the contractor from sole responsibility for the care and protection of materials and work upon which payments have been made or the restoration of any damaged work or as a waiver by the University of its rights to require fulfillment of all terms of the contract.

10.1.6 Recommendation for approval of a requisition for payment will constitute a representation by the University’s project manager and/or the Architect/Engineer to the contracting officer based on his/her inspections at the site and data contained in the requisition for payment that the work has progressed to the point indicated, that, to the best of his/her knowledge, information and belief, the quality of the work is in accordance with the contract documents and that the contractor is entitled to payment in the amount certified. By recommending approval of a requisition for payment, however, the University’s project manager and/or Architect/Engineer shall not thereby be deemed to represent that he/she has made exhaustive or continuous on-site inspections to check the quality or quantity of the work or that
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he/she has reviewed the construction means, methods, techniques, sequences or procedures or that he/she has made any examination to ascertain how and for what purpose the contractor has used the monies previously paid on account of the contract sum.

10.1.7 If any corporation licensed to do business in New Jersey shall be or become delinquent in the payment of taxes due the State, unless under an active appeal process, the contracting officer may withhold monies due to the said corporation for the purpose of assuring the payment to the State of such taxes.

10.2 INVOICES

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10.2.4 For the purpose of determining if interest begins to accrue under the State's Prompt Payment Act:

a) a proper invoice will be deemed to have been received when it is received in the proper form and with all required attachments by the office designated for receipt of invoices and acceptance of the supplies delivered or services rendered has occurred

b) payment shall be considered made on the date on which a check for such payment is dated

c) payment terms; i.e., "net 20"; offered by the contractor will not be deemed a "required payment date"

d) the following period of time will not be included:
   1) after receipt of an improper invoice and prior to notice of any defect or impropriety but not to exceed sixty (60) calendar days
   2) between the date of a notice of any defect or impropriety and the date a proper invoice is received; when the notice is in writing, it shall be considered made on the date shown on the notice

10.3 INTEREST

10.3.1 Interest shall be paid on the amount due to the contractor pursuant to a properly executed State invoice in reference to general condition 10.2 if the required payment is not made on or before the required payment date.

10.3.2 The required payment date shall be sixty (60) calendar days from the receipt of a properly completed and executed invoice.

10.3.3 Interest on amounts due shall be paid to the contractor for the period beginning on the day after the required payment date and ending on the date on which the check for payment is drawn. The interest shall be paid at a rate, which is specified by
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State Treasurer pursuant to "New Jersey Prompt Payment Act".

10.3.4 No interest charge as required by this provision shall become a debt of the State until it exceeds five dollars ($5.00).

10.3.5 Interest may be paid by separate payment to the contractor but shall be paid within thirty (30) calendar days of payment of the original invoice.

10.3.6 The State Treasurer shall have the right to waive the interest payment for delinquencies due to circumstances beyond the control of the contracting officer or other State or University representatives involved in the processing of contractor invoices including, but not limited to, strikes and natural disasters.

10.3.7 Nothing in this provision nor the New Jersey Prompt Payment Act shall be construed as permitting the accrual of prejudgment interest in the case of a disputed contract for which a notice of claim has been filed pursuant to N.J.S.A. 59:13-3 et.seq. as provided in N.J.S.A. 59:13-8.

10.4 WITHHOLDING PAYMENT FOR NON-DELIVERY OF DATA:

(a) If technical data, such as "as built" drawings, reports, spare parts lists, repair parts lists or the like or instruction books including operational and maintenance manuals or any part thereof are not delivered within the time specified by this contract or are deficient upon delivery, the contracting officer shall withhold from each invoice a percentage in addition to any other retainage required by the contract or the contract price in accordance with the following table:

<table>
<thead>
<tr>
<th>When Total Contract Price Is:</th>
<th>Percentage to be Withheld Is:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $250,000</td>
<td>10%</td>
</tr>
<tr>
<td>$250,000 to $1,000,000</td>
<td>5%</td>
</tr>
<tr>
<td>Over $1,000,000</td>
<td>2%</td>
</tr>
</tbody>
</table>

(b) The withholding of any sums pursuant to this section shall not be construed as or constitute in any manner a waiver by the University of the contractor's obligation to furnish the data required under this contract. In the event the contractor fails to furnish these items, the University shall have those rights and remedies provided by law and pursuant to this contract in addition to and not in lieu of the sums withheld in accordance with this section.

10.5 FINAL PAYMENT

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ARTICLE 11 - UNCOVERING AND INSPECTION OF WORK
11.1 UNCOVERING AND INSPECTION OF WORK

11.1.1 If any portion of the work is covered prior to inspection conducted by the contracting officer or the University’s project manager or Architect/Engineer or any other person, it shall be uncovered for observation. Uncovering and replacement of covering shall be at the installation contractor's expense. The contractor is obligated to advise the contracting officer and the University’s project manager of all work scheduled to be covered which is reasonably subject to prior inspection before actual covering.

11.2 CORRECTION OF WORK

11.2.1 The contractor shall promptly correct all work rejected by the contracting officer the University’s project manager or the Architect/Engineer as defective or as failing to conform to the contract documents whether observed before or after final acceptance and whether or not fabricated, installed or completed. The contractor shall bear all costs of correcting such rejected work including the University’s project manager’s or Architect's/Engineer's additional services, if any.

11.2.2 The contractor shall remove from the site all portions of the work, which are defective, or non-conforming and which have not been corrected unless the contracting officer waives removal.

11.2.3 If the contractor does not proceed with the correction of such defective or non-conforming work within a reasonably time, fixed by written notice from the contracting officer, University’s project manager or the Architect/Engineer. The contracting officer may make arrangements for such correction by others and charge the cost of doing so to the contractor and/or his/her sureties. The contracting officer may also remove the defective or non-conforming work and may store the materials or equipment at the expense of the contractor. If the contractor does not pay for the cost of such removal and storage within ten (10) additional days written notice, the contracting officer shall sell such material and equipment at auction or at private sale and shall account for the net proceeds thereof after deducting all of the costs which are the responsibility of the contractor including compensation for the University’s project manager or Architect's/Engineer's additional services, if any. If such proceeds of sale do not cover all costs, which the contractor should have borne, the difference shall be charged to the contractor and an appropriate credit change order shall be issued. If the payments then or thereafter due the contractor are not sufficient to cover such amount, the contractor and/or his/her surety shall pay the difference to the University.

11.2.4 The contractor shall also be responsible for the cost of making good all work destroyed or damaged by such correction or removal.

11.2.5 Nothing contained herein shall be construed to establish a period of limitation with respect to any other obligation, which the contractor might have under the contract documents.
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11.3 ACCEPTANCE OF DEFECTIVE OR NON-CONFORMING WORK

11.3.1 If the contracting officer determines that the best interests of the University will be served by accepting defective or non-conforming work, he/she may do so instead of requiring its removal and correction. In such instance, a change order will be issued to reflect an appropriate and equitable reduction in the contract sum. Such adjustment shall be effected regardless of final payment having been previously made and the contractor and/or his/her surety shall be responsible for promptly providing any funds due the University as a result thereof.

ARTICLE 12 - PROTECTION OF PERSONS AND PROPERTY

12.1 SAFETY PRECAUTIONS AND PROGRAMS

12.1.1 The contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work. He/she shall designate a responsible member of his/her organization at the site whose duty shall be the prevention of accidents. This person shall be the contractor's superintendent unless otherwise designated by the contractor in writing to the University and the University's project manager.

12.2 SAFETY OF PERSONS AND PROPERTY

12.2.1 The contractor shall give all notices and comply with all applicable laws, ordinance, rules, regulations and lawful orders of any public authority bearing on the safety of persons or property or their protection from damage, injury or loss, including but not limited to OSHA.

12.2.2 The contractor shall take all necessary precautions for the safety of and shall provide all necessary protection to prevent damage, injury and loss to:

(a) every employee on the work and all other persons who may be affected thereby
(b) all the work and all materials and equipment to be incorporated therein whether in storage on or off the site, under the care, custody or control of the contractor or any of his/her sub-contractors or sub-sub-contractors.
(c) other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designed for removal, relocation or replacement in the course of construction

12.2.3 As required by existing conditions and progress of work, the contractor shall erect and maintain all necessary safeguards for safety and protection, including but not limited to rails, night lights, the posting of danger signs and other warnings against hazards, promulgating safety regulations, notifying owners and users of adjacent utilities and other means of protection against accidental injury or damage to persons and property.

12.2.4 When the use or storage of explosives or other hazardous materials or equipment is necessary for the execution of the work, the contractor shall exercise the utmost
12.2.5 The contractor shall not load or permit any part of the work to be loaded so as to endanger the work or any person.

12.2.6 The contractor shall promptly remedy all damage or loss to any property caused in whole or in part by the contractor, any of his/her sub-contractors, sub-sub-contractors or anyone directly or indirectly employed by any of these or by anyone for whose acts any of them may be liable and for which the contractor is responsible except damage or loss attributable solely to the acts or omissions of the University, the Architect/Engineer or anyone directly or indirectly employed by either of them or by anyone of whose acts either of them may be liable and not attributable to the fault or negligence of the contractor. The foregoing obligations of the contractor are in addition to his/her obligations stated elsewhere herein.

12.2.7 The contractor shall provide and maintain in good operating condition suitable and adequate fire protection equipment and services and shall comply with all reasonable recommendations regarding fire protection made by the representatives of the property insurance company carrying insurance on the work or by the local fire chief or fire marshal and other entity with jurisdiction over the site. The area within the site limits and surrounding areas shall be kept orderly and clean and all combustible and other rubbish shall be promptly removed from the site.

12.2.8 At all times, the contractor shall protect excavations, trenches, buildings and materials from rain water, ground water, back-up or leakage of sewers, drains and other piping and from water of any other origin and shall promptly remove any accumulation of water. The contractor shall provide and operate all pumps, piping and other equipment necessary to this end.

12.2.9 The contractor shall remove snow and ice, which might result in damage or delay.

12.2.10 In the event that contractor fails to comply with the provisions of the Section 12.2, the University may withhold from each invoice a percentage in addition to any other retainage required by the contract or the contract price in accordance with the following table:

<table>
<thead>
<tr>
<th>Total Contract Price</th>
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<td>2%</td>
</tr>
</tbody>
</table>

The withholding of any sums pursuant to this section shall not be construed as or constitute in any manner a waiver by the University of the contractor's obligation to comply with the provisions of this Section 12.2. In the event the contractor fails to comply with the provisions of this Section 12.2, the University shall have those rights and remedies provided by law and pursuant to this contract in addition to and not in lieu of the sums withheld in accordance with this section.
12.3 EMERGENCIES

12.3.1 In any emergency affecting the safety of persons or property, the contractor shall act with diligence at his/her discretion to prevent threatening injury, damage or loss. In such case, he/she shall immediately notify those individuals or entities designated at the pre-construction meeting. The Contractor shall immediately thereafter notify the contracting officer through the University’s project manager of the action taken and shall forthwith prepare and submit a detailed and documented report of the occurrence and all actions taken in response thereto.

ARTICLE 13 - INSURANCE AND INDEMNITY

13.1 CONTRACTOR INSURANCE REQUIREMENTS

13.1.1 The Contractor shall secure and maintain in force for the term of the Contract, insurance coverage provided herein. All insurance coverage is subject to the approval of the University and shall be issued by an insurance company authorized to do business in the State of New Jersey and which maintains an A.M. Best rating of A- (VII) or better.

13.1.2 The Contractor shall provide the University with current Certificates of Insurance for all coverage and renewals thereof which must contain the provision that the insurance provided in the certificate shall not be canceled for any reason except after thirty (30) days written notice to the University. All insurance required herein shall contain a waiver of subrogation in favor of the University. All insurance required herein, except Workers’ Compensation and Owners and Contractors Protective, shall name ROWAN University, the State of New Jersey, the architect/engineer and University’s Project Manager as additional insureds.

13.1.3 Commercial General Liability insurance written on an occurrence form including independent contractor liability, products/completed operations liability, contractual liability, covering but not limited to the liability assumed under the indemnification provisions of this contract. Coverage for bodily injury and property damage claims arising out of the professional acts of the general contractor and subcontractors shall also be included. The policy shall not include any endorsement that restricts or reduces coverage as provided by the ISO CG0001 form without the approval of the University. The minimum limits of liability shall not be less than a combined single limit of one million dollars ($1,000,000) per occurrence, two million dollars ($2,000,000) general aggregate, three million dollars ($3,000,000) product/completed operations aggregate. The Products and Completed Operations insurance shall be maintained for two (2) years after final payment. A “per project endorsement” shall be included, so that the general aggregate limit applies solely to the project that is the subject of this contract.

13.1.3 Comprehensive Automobile Liability covering owned, non-owned, and hired vehicles. The limits of liability shall not be less than a combined single limit of one million dollars ($1,000,000) per occurrence.
13.1.4 Worker's Compensation Insurance applicable to the laws of the State of New Jersey and other State or Federal jurisdiction required to protect the employees of the Contractor and any Subcontractor who will be engaged in the performance of this Contract. The certificate must so indicate that no proprietor, partner, executive officer or member is excluded. This insurance shall include Employers' Liability Protection with a limit of liability not less than one million dollars ($1,000,000) bodily injury, each occurrence, one million dollars ($1,000,000) disease, each employer, and two million dollars ($2,000,000) disease, aggregate limit. Including the employer’s liability insurance under the umbrella insurance can satisfy the limit requirements.

13.1.5 The Contractor shall obtain and maintain a separate Owners and Contractor's Protective Liability Insurance Policy for the same limits of liability as specified for the Commercial General Liability Insurance in the name of the University, the State of New Jersey. The Architect/Engineer, and the University's Project Manager are to be named as additional insured. The policy shall be maintained in force for the term of the Project or one year, whichever is longer.

13.1.6 Excess Liability, umbrella insurance form, applying excess of primary to the commercial general liability, commercial automobile liability and employer’s liability insurance shall be provided with minimum limits of three million dollars ($3,000,000) per occurrence, three million dollars ($3,000,000) general aggregate, and three million dollars ($3,000,000) products/completed operations.

13.1.6.1 The General Liability insurance General Aggregate and Umbrella Excess Liability limits shall apply and be written exclusively, in total, to this Project only. A per project endorsement for all coverage’s and limits must be included in each policy.

  a) Bodily injury and property damage insurance policies shall be so written as to provide coverage for special hazards where such hazards will be incidental to subcontractors' work.

13.1.7 The contractor shall require all its subcontractors and sub-subcontractors and any other company employed by the contractor working on this project to maintain during the life of the contract agreement(s) between itself and its sub-contractors, along with agreements between its subcontractors and their subcontractors, until final acceptance of the work by the University the insurance limits and requirements as defined above. It is a contractor option to determine the amount of excess liability it will require its subcontractors to carry however all insurance shall be written on a “per project” basis. The contractor shall be responsible for obtaining certificates of insurance from all of its subcontractors, sub-subcontractors, etc. for all coverage and renewals thereof for each company either hired directly by the contractor or hired by the contractors subcontractors working on this project prior to each company beginning work on the project. The contractor shall provide copies of all subcontractor certificates of insurance to the University.

  a) ALL SUBCONTRACTOR CERTIFICATES MUST BE SUBMITTED PRIOR TO
THE START OF WORK ON THE SITE.

13.1.8 Prior to commencement of construction, the contractor shall provide four (4) certified copies of such insurance policy or certificate of such insurance to be delivered to the University’s project manager and the University.

13.1.9 Should the contractor fail to comply with all insurance requirements indicated in the contract documents and provide satisfactory evidence of such compliance to the University within seven (7) calendar days of the issuance of a Notice to Proceed, contract and/or receipt by the contractor of a University purchase order on this project from the University, the contracting officer will consider the contractor to be in violation of the contract documents. Upon such declaration of a breach of contract, the contracting officer through the University’s project manager without prejudice to any other right or remedy available to the University and after giving the contractor and/or its surety three (3) working days written notice can either terminate the employment of the contractor for this project or purchase the required insurance. If the University chooses to purchase the required insurance it will deduct the cost of said insurance from the contact amount agreed upon with the contractor. Under either option selected by the University the contractor will have no recourse against the University.

13.2 INSURANCE TO BE CARRIED BY THE UNIVERSITY

13.2.1 The University shall provide insurance protection in the form of a Builders Risk Insurance or similar Policy upon the structure for which the Work on this Contract is to be done. The structure will be insured for 100% of the insurable replacement value thereof including materials, owned by the University, in place or to be used as part of the permanent construction including surplus materials. Should the structure be damaged or destroyed as a result of the contractors’ negligence the University will subrogate against the contractor for the cost to repair or replace the damage to bring the structure back to the condition intended under this contract.

13.2.2 This insurance shall not protect against damage or loss to any of the Contractor's or Subcontractor's property including but not limited to tools, equipment, scaffolding, staging towers or forms, Contractor's materials and sheds or other temporary structures erected for used by the Contractor or Subcontractors. It is understood that the Contractor will at their own expense, carry all insurance which may be required to provide the necessary protection against such loss or damage herein described which insurance shall contain a waiver of any right of subrogation against the University.

13.2.3 The insurance procured by the University under this paragraph may provide for a deductible. The Contractor shall assume the responsibility for any deductible for any builder’s risk loss it may make claim for under this policy.

13.2.4 The Contractor shall immediately notify the University, in writing and take any other appropriate steps as may be required under the standard Builder’s Risk
Insurance Policy in effect in the event of any loss. Prior to the acceptance of the building by the University, the Contractor shall, at the University's option, replace and repair the damaged Work as originally provided in the drawings and specifications at no additional compensation to that provided in the original contract.

13.2.5 All losses will be adjusted with, and payable to, the University.

13.2.6 The Contractor shall not include any cost for Builders Risk insurance premiums as described herein. However, this provision shall not relieve the Contractor from their obligation to complete, according to plans and specifications, the project covered by the contract, and the Contractor and their Surety shall be obligated to full performance of the Contractor's undertaking.

ARTICLE 14 - CHANGES IN THE WORK

14.1 CHANGES IN THE WORK

14.1.1 Changes to this Contract may only be accomplished by a Change Order issued in accordance with the procedures set forth in this Article 14 and Division #1 of the Specifications. The Change Order may result in an increase, decrease or have no effect upon the Contract Price only. The contract time cannot and will not be adjusted for any reason.

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14.1.3 Change Orders shall include all impacts that the change to the work may have upon the performance of the job and shall resolve all issues between the parties related, either directly or indirectly, to the change. By executing the Change Order, the Contractor waives the right to assert any future claims of any kind caused in whole or in part by the change.

14.2 OWNER DIRECTED CHANGES

14.2.1 At any time after execution of this contract by all parties the contracting officer may make any change in the work within the general scope of the contract including, but limited to, changes as follows:

a) in the specifications, including drawings and designs;
b) in the method or manner of performance of the work;
c) in the University furnished facilities, equipment, materials, services or site;
d) directing acceleration in the performance of the work.

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14.4 FAILURE TO PROVIDE NOTIFICATION

14.4.1 In the event that the Contractor fails to provide the immediate notification to the University’s project manager and/or to complete the “Change Order Request” pursuant to and as specified elsewhere in the contract documents with the supporting documentation as set forth in the Specifications, the Contractor shall have waived any and all claims for additional compensation related to said changes or conditions encountered.

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14.5.3 In the event that the parties cannot agree to a lump sum amount for a Change Order, the University’s contracting officer shall be permitted to order the Contractor to complete the work covered by the Change Order on a time and material basis, under procedures established by the University’s project manager to ensure the proper accounting of direct labor and direct material costs. The Contractor shall be allowed the same allowance for overhead and profit as set forth in the contract documents.

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14.6.1 LEFT BLANK

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14.7 CONTINUATION OF THE WORK

14.7.1 In order to avoid delays in the progress of work or when, in the best interest of the University, the contracting officer may, at his/her discretion, direct the contractor in writing to proceed with a change without a prior or final agreement on costs and/or scope of work. Such direction shall be in the form of an unpriced Change Order or written direction. If the contractor has or intends to assert a request for additional compensation under this article, he/she shall turn over to the University’s project manager in sufficient detail and in accordance with all contract document requirements hereof all necessary information and costs as required by the contacting officer after receipt of an unpriced change order or written direction.

14.7.2 Where the cost of property made obsolete or excess as a result of a change is included in the contractor's request for adjustment, the contracting officer shall have the right to prescribe the manner of deposition of such property.

ARTICLE 15 - ASSIGNMENT OF ANTITRUST CLAIM(S)

15.1 ASSIGNMENT OF ANTITRUST CLAIM(S)
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15.1.1 The contractor recognizes that in actual economic practice, overcharges resulting from antitrust violations are, in fact, usually borne by the ultimate purchaser. Therefore, and as a consideration for executing this contract, the contractor, acting herein by and through its duly authorized agent, hereby conveys, sells, assigns and transfers to the University all right, title and interest to all claims and causes of action it may now or hereafter acquire under the antitrust laws of the United States or the State of New Jersey relating to the particular goods or services purchased or acquired by the University pursuant to this contract.

In connection with this agreement, the following are the express obligations of the contractor:

a) it will take no action, which will in any way diminish the value of the rights conveyed or assigned hereunder
b) it will advise the University:
   (1) in advance of its intention to commence any action on its own behalf regarding such claim or cause(s) of action
   (2) immediately upon becoming aware of the fact that action has been commenced on its behalf by some other person(s) of the pendency of such action
c) it will notify the defendants in any antitrust suit of the fact of the within assignment at the earliest practicable opportunity after the contractor has initiated an action on its behalf or becomes aware that such an action has been filed on his/her behalf by any other person; a copy of such notice will be sent to the University.

Furthermore, it is understood and agreed that in the event any payment under any such claim or cause of action is made to the contractor, it shall promptly pay over to the University the aliquot share thereof, if any, assigned to the University herein.

ARTICLE 16 - AFFIRMATIVE ACTION REQUIREMENTS

16.1 POLICY STATEMENT

It has long been the policy of the University to promote equal employment opportunity by prohibiting discrimination in employment and requiring affirmative action in the performance of contracts funded by the University. This policy has been reinforced and expended by an act of the legislature. The new statute, New Jersey Public Law 1975, Chapter IR, provides that no public works contractor can be awarded nor any monies paid until the prospective contractor has agreed to contract performance, which complies with the approved affirmative action plan. The law applies to each political subdivision and agency of the State and includes procurement and service contracts as well as construction contracts. This section was prepared to explain the affirmative action requirements and procedures for public agencies awarding contracts and for contractors bidding on contracts. To assure effective implementation of the affirmative action law while allowing the business operations of a government to proceed efficiently, these regulations are designed to minimize administrative paperwork and delays.
16.2 MANDATORY LANGUAGE

During the performance of this contract, the contractor agrees as follows:

a) Where applicable, the contractor or sub-contractor will not discriminate against any employee or applicant for employment because of age, race, creed, color, national origin, ancestry, marital status, sex, affectional or sexual orientation. The contractor will take affirmative action to insure that such applicants are recruited and employed and that employees are treated during employment without regard to their age, race, creed, color, national origin, ancestry, marital status, sex, affectional or sexual orientation. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, transfer, recruitment or recruitment advertising, lay-off or termination, rates of pay or other forms of compensation and the selection for training, including apprenticeship. The contractor agrees to post in conspicuous places available to employees and applicants for employment notices to be provided by the public agency compliance officer setting forth provisions of this non-discrimination clause.

b) Where applicable, the contractor or sub-contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to age, race, creed, color, national origin, ancestry, marital status, sex, affectional or sexual orientation.

c) Where applicable, the contractor or sub-contractor will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding a notice to be provided by the agency contracting officer advising the labor union or worker's representative of the contractor's commitments under this act and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

d) Where applicable, the contractor or sub-contractor agrees to comply with any regulations promulgated by the Treasurer pursuant to P.L. 1975, c.127, as amended and supplemented from time to time.

e) When hiring workers in each construction trade, the contractor or sub-contractor agrees to attempt in good faith to employ minority and female workers in each construction trade consistent with the applicable employment goal prescribed by

N.J.A.C. 17:27-7.3 provided, however, that the affirmative action officer may, in its discretion, exempt a contractor or sub-contractor from compliance with the good faith procedures prescribed by the following provisions (a), (b) and (c) as long as the affirmative action officer is satisfied that the contractor is employing workers provided by a union which provides evidence in accordance with standards prescribed by the affirmative action officer that its percentage of active, "card carrying" members who are minority and female workers is equal to or greater than the applicable employment goal prescribed by N.J.A.C. 17:27-7.3 promulgated by the Treasurer pursuant to P.L. 1975, c.127, as amended and supplemented from time to time. The contractor or sub-contractor agrees that a good faith effort shall include compliance with the
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following procedures:

1) If the contractor or sub-contractor has a referral agreement or arrangement with a union for a construction trade, the contractor or sub-contractor shall, within three (3) days of the contract award, seek assurances from the union that it will cooperate with the contractor or sub-contractor as it fulfills its affirmative action obligations under this contract and in accordance with the rules promulgated by the Treasurer pursuant to P.L. 1975, c.127, as it is amended and supplemented from time to time. If the contractor or sub-contractor is unable to obtain said assurances from the construction trade union at least five (5) days prior to the commencement of construction work, the contractor or sub-contractor agrees to directly attempt to hire minority and female workers consistent with the applicable employment goal. If the contractor's or sub-contractor's prior experience with a construction trade union, regardless of whether the union has provided said assurances, indicates a significant possibility that the trade union will not refer sufficient minority and female workers consistent with the applicable employment goal, the contractor or sub-contractor agrees to be prepared to hire minority and female workers directly consistent with the applicable employment goal by complying with the hiring procedures prescribed under (2) below and the contractor or sub-contractor further agrees to take immediate said action if it determines or is so notified by the affirmative action office that the union is not referring minority and female workers consistent with the applicable employment goal.

2) If the hiring of a workforce consistent with the employment goal has not or cannot be achieved for each construction trade by adhering to the procedures of (1) above or if the contractor or sub-contractor does not have a referral agreement or arrangement with a union for a construction trade, the contractor or sub-contractor agrees to take the following actions consistent with the applicable county employment goals.
   (a) to notify the public agency compliance officer, affirmative action office and at least one (1) approved minority referral organization of its manpower needs and request the referral of minority and female workers;
   (b) to notify any minority and female workers who have been listed with it as awaiting available vacancies;
   (c) prior to commencement of work to request the local construction trade union, if the contractor or sub-contractor has a referral agreement or arrangement with a union for the construction trade, to refer minority and female workers to fill job openings;
   (d) to leave standing requests for additional referral to minority and female workers with the local construction trade union if the contractor or sub-contractor has a referral agreement or arrangement with a union for the construction trade, the State training and employment service and the other approved referral sources in the area until such time as the workforce is consistent with the employment goal;
   (e) if it is necessary to lay-off some of the workers in a given trade on the
ROWAN UNIVERSITY
SECTION II
GENERAL CONDITIONS

construction site to assure, consistent with the applicable State and Federal statutes and court decisions, that sufficient minority and female employees remain on the site consistent with the employment goal and to employ any minority and female workers laid-off by the contractor or on any other construction site in the area on which its workforce composition is not consistent with an employment goal established pursuant to rules implementing P.L. 1975, c.127;

(f) to adhere to the following procedure when minority and female workers apply or are referred to the contractor or sub-contractor:

(i) If said individuals have never previously received any document or certification signifying a level of qualification lower than that required, the contractor or sub-contractor shall determine the qualifications of such individuals and, if the contractor's or sub-contractor's workforce in each construction trade is not consistent with the applicable employment goal, it shall employ such persons which satisfy appropriate qualification standards provided, however, that a contractor or sub-contractor shall determine that the individual at least possess the skills and experience recognized by any workers' skill and experience classification determination which may have been made by a public agency compliance officer, union, apprentice program or referral agency provided the referral agency is acceptable to the affirmative action office and provided further that, if necessary, the contractor or sub-contractor shall hire minority and female workers who qualify as trainees pursuant to these regulations. All of the requirements of this paragraph, however, are limited by the provisions of paragraph (3) below.

(ii) If the contractor's or sub-contractor's workforce is consistent with the applicable employment goal, the name of said minority or female group individual shall be maintained on a waiting list for the first consideration in the event the contractor's or sub-contractor's workforce is no longer consistent with the applicable employment goal.

(iii) If, for any reason, said contractor or sub-contractor determines that a minority individual or a female is not qualified or if the individual qualifies as an advanced trainee or apprentice, the contractor or sub-contractor shall inform the individual in writing with the reasons for the determination and maintain a copy in its files and send a copy to the public agency compliance officer and to the affirmative action office.

(g) to keep a complete and accurate record of all requests made for the referral of workers in any trade covered by the contract on forms made available by the affirmative action office and shall be submitted promptly to that office upon request.

3) The contractor or sub-contractor agrees that nothing contained in (2) preceding provision shall preclude the contractor or sub-contractor from complying with the hiring hall or apprenticeship provisions in any applicable bargaining agreement or hiring hall arrangement and, where required by
custom or agreement, it shall send journeymen and trainees to the union for referral or to the apprenticeship program for admission pursuant to such agreement or arrangement provided, however, that where the practices of a union or apprenticeship program will result in the exclusion of minorities and females or the failure to refer minorities and females consistent with the county employment goal, the contractor or sub-contractor shall consider for employment persons referred pursuant to said provisions (2) without regarding to such agreement or arrangement; provided further, however, that the contractor or sub-contractor shall not be required to employ minority and female advanced trainees and trainees in numbers which result in the employment of advanced trainees and trainees as a percentage of the total workforce for the construction trade which percentage significantly exceeds the apprentice to journey worker ratio specified in the applicable collective bargaining agreement or, in the absence of a collective bargaining agreement, exceeds the ratio established by practice in the area for said construction trade. Also, the contractor or sub-contractor agrees that in implementing the procedures of the preceding provisions (2) it shall, where applicable, employ minority and female workers residing within the geographical jurisdiction of the union.

4) The contractor agrees to complete an initial manning report on forms provided by the affirmative action office on in the form prescribed by the affirmative action office and submit a copy of said form no later than three (3) days after signing a construction contract provided, however, that the public agency may extend in a particular case the allowable time for submitting the form to no more than fourteen (14) days and to submit a copy of the monthly project manning report once a month by the seventh (7th) work day of each month thereafter for the duration of this contract to the affirmative action office and to the public agency compliance officer. The contractor agrees to cooperate with the public agency in the payment of budgeted funds as is necessary for on-the-job and off-the-job programs for outreach and training of minority and female trainees employed on the construction site.

5) The contractor and its sub-contractors shall furnish such reports or other documents to the affirmative action office as may be requested by the office from time to time in order to carry out the purposes of these regulations and public agencies shall furnish such information as may be requested by the affirmative action office for conducting a compliance investigation pursuant to Sub-Chapter 10 of the Administrative Code, N.J.A.C. 17:27.

END OF SECTION II
THIS AGREEMENT, made this day of , 2017, by and between ROWAN UNIVERSITY, herein called “Owner”, acting herein through its VP of Finance and CFO, and

CONTRACTOR NAME
CONTRACTOR ADDRESS
CONTRACTOR CITY, STATE & ZIP CODE

A Corporation, State of New Jersey, hereinafter called CONTRACTOR. The Contractor hereby agrees with the Owner to commence and complete the construction described as follows:

<ENTER PROJECT NAME>
PROJECT NO. 77XXX

The Contractor agrees to furnish all labor, material, equipment and services necessary to construct and complete the project as detailed in Rowan University’s Bid No. , dated , hereinafter called the Project, for the sum of , to include the base bid items and to include all work in connection therewith, under the terms as stated in the Bid Documents, and at his (its or their) own proper cost and expense to furnish all the materials, supplies, machinery, equipment tools, superintendence, labor, insurance, and services necessary to complete the said project in accordance with the conditions and prices stated in the Contract Documents, as detailed on Exhibit “A” attached hereto and made a part hereof.

Unless the Notice to Proceed specifies a different date, the contractor hereby agrees to commence work under this contract as soon as possible but no later than , and to fully complete the project within consecutive calendar days thereafter. Time is the essence for the completion of this contract. The Contractor further agrees to pay, as liquidates damages, the sum of for each consecutive calendar day thereafter as hereinafter provided in Article 8 of the General Conditions.

The OWNER agrees to pay the CONTRACTOR for the performance of the contract, subject to additions and deductions, as provided in the General Conditions of the Contract Specifications, and to make payments on account thereof as provided in Article 10 of the General Conditions and Section 012500 – Contract Modification Procedures.
“The Contractor shall comply with the provisions of Chapter 33, of Title 52 of the Revised Statues (R.S. 52:33-1 et seq) requiring that preference be given to the use of domestic materials or as same may be governed by Federal Law or Regulation.

**Mandatory Equal Employer Opportunity Language N.J.S.A. 10:5-31 et seq., N.J.A.C. 17:27**

**During the performance of this contract, the contractor agrees as follows:**

The contractor or subcontractor, where applicable, will not discriminate against any employee or applicant for employment because of age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Except with respect to affectional or sexual orientation and gender identity or expression, the contractor will ensure that equal employment opportunity is afforded to such applicants in recruitment and employment, and that employees are treated during employment, without regard to their age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Such equal employment opportunity shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Public Agency Compliance Officer setting forth provisions of this nondiscrimination clause.

The contractor or subcontractor, where applicable will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex.

The contractor or subcontractor, where applicable, will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency contracting officer advising the labor union or workers' representative of the contractor's commitments under this act and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

The contractor or subcontractor where applicable, agrees to comply with any regulations promulgated by the Treasurer pursuant to N.J.S.A. 10:5-31 et seq., as amended and supplemented from time to time and the Americans with Disabilities Act.

When hiring or scheduling workers in each construction trade, the contractor or subcontractor agrees to make good faith efforts to employ minority and women workers in each construction trade consistent with the targeted employment goal prescribed by N.J.A.C. 17:27-7.2; provided, however, that the Division may, in its discretion, exempt a contractor or subcontractor from compliance with the good faith procedures prescribed by the following provisions, A, B and C, as long as the Division is satisfied that the contractor or subcontractor is employing workers provided by a union which provides evidence, in accordance with standards prescribed by the Division, that its percentage of active "card carrying" members who are minority and women workers is equal to or greater than the targeted employment goal established in accordance with N.J.A.C. 17:27-7.2.
The contractor or subcontractor agrees that a good faith effort shall include compliance with the following procedures:

(A) If the contractor or subcontractor has a referral agreement or arrangement with a union for a construction trade, the contractor or subcontractor shall, within three business days of the contract award, seek assurances from the union that it will cooperate with the contractor or subcontractor as it fulfills its affirmative action obligations under this contract and in accordance with the rules promulgated by the Treasurer pursuant to N.J.S.A. 10:5-31 et. seq., as supplemented and amended from time to time and the Americans with Disabilities Act. If the contractor or subcontractor is unable to obtain said assurances from the construction trade union at least five business days prior to the commencement of construction work, the contractor or subcontractor agrees to afford equal employment opportunities to minority and women workers directly, consistent with this chapter. If the contractor's or subcontractor's prior experience with a construction trade union, regardless of whether the union has provided said assurances, indicates a significant possibility that the trade union will not refer sufficient minority and women workers consistent with affording equal employment opportunities as specified in this chapter, the contractor or subcontractor agrees to be prepared to provide such opportunities to minority and women workers directly, consistent with this chapter, by complying with the procedures prescribed under (B) below; and the contractor or subcontractor further agrees to take said action immediately if it determines or is so notified by the Division that the union is not referring minority and women workers consistent with the equal employment opportunity goals set forth in this chapter.

(B) If good faith efforts to meet targeted employment goals have not or cannot be met for each construction trade by adhering to the procedures of (A) above, or if the contractor does not have a referral agreement or arrangement with a union for a construction trade, the contractor or subcontractor agrees to take the following actions:

(1) To notify the public agency compliance officer, the Division, and minority and women referral organizations listed by the Division pursuant to N.J.A.C. 17:27-5.3, of its workforce needs, and request referral of minority and women workers;

(2) To notify any minority and women workers who have been listed with it as awaiting available vacancies;

(3) Prior to commencement of work, to request that the local construction trade union refer minority and women workers to fill job openings, provided the contractor or subcontractor has a referral agreement or arrangement with a union for the construction trade;
(4) To leave standing requests for additional referral to minority and women workers with the local construction trade union, provided the contractor or subcontractor has a referral agreement or arrangement with a union for the construction trade, the State Training and Employment Service and other approved referral sources in the area;

(5) If it is necessary to lay off some of the workers in a given trade on the construction site, layoffs shall be conducted in compliance with the equal employment opportunity and non-discrimination standards set forth in this regulation, as well as with applicable Federal and State court decisions;

(6) To adhere to the following procedure when minority and women workers apply or are referred to the contractor or subcontractor:

(i) If said individuals have never previously received any document or certification signifying a level of qualification lower than that required in order to perform the work of the construction trade, the contractor or subcontractor shall in good faith determine the qualifications of such individuals. The contractor or subcontractor shall hire or schedule those individuals who satisfy appropriate qualification standards in conformity with the equal employment opportunity and non-discrimination principles set forth in this chapter. However, a contractor or subcontractor shall determine that the individual at least possesses the requisite skills, and experience recognized by a union, apprentice program or a referral agency, provided the referral agency is acceptable to the Division. If necessary, the contractor or subcontractor shall hire or schedule minority and women workers who qualify as trainees pursuant to these rules. All of the requirements, however, are limited by the provisions of (C) below.

(ii). The name of any interested women or minority individual shall be maintained on a waiting list, and shall be considered for employment as described in paragraph (i) above, whenever vacancies occur. At the request of the Division, the contractor or subcontractor shall provide evidence of its good faith efforts to employ women and minorities from the list to fill vacancies.

(iii). If, for any reason, said contractor or subcontractor determines that a minority individual or a woman is not qualified or if the individual qualifies as an advanced trainee or apprentice, the contractor or subcontractor shall inform the individual in writing of the reasons for the determination, maintain a copy of the determination in its files, and send a copy to the public agency compliance officer and to the Division.
(7). To keep a complete and accurate record of all requests made for the referral of workers in any trade covered by the contract, on forms made available by the Division and submitted promptly to the Division upon request.

(C) The contractor or subcontractor agrees that nothing contained in (B) above shall preclude the contractor or subcontractor from complying with the union hiring hall or apprenticeship policies in any applicable collective bargaining agreement or union hiring hall arrangement, and, where required by custom or agreement, it shall send journeymen and trainees to the union for referral, or to the apprenticeship program for admission, pursuant to such agreement or arrangement. However, where the practices of a union or apprenticeship program will result in the exclusion of minorities and women or the failure to refer minorities and women consistent with the targeted county employment goal, the contractor or subcontractor shall consider for employment persons referred pursuant to (B) above without regard to such agreement or arrangement; provided further, however, that the contractor or subcontractor shall not be required to employ women and minority advanced trainees and trainees in numbers which result in the employment of advanced trainees and trainees as a percentage of the total workforce for the construction trade, which percentage significantly exceeds the apprentice to journey worker ratio specified in the applicable collective bargaining agreement, or in the absence of a collective bargaining agreement, exceeds the ratio established by practice in the area for said construction trade. Also, the contractor or subcontractor agrees that, in implementing the procedures of (B) above it shall, where applicable, employ minority and women workers residing within the geographical jurisdiction of the union.

After notification of award, but prior to signing a construction contract, the contractor shall submit to the public agency compliance officer and the Division an initial project workforce report (Form AA 201) provided to the public agency by the Division for distribution to and completion by the contractor, in accordance with N.J.A.C. 17:27-7. The contractor also agrees to submit a copy of the Monthly Project Workforce Report once a month thereafter for the duration of this contract to the Division and to the public agency compliance officer.

The contractor agrees to cooperate with the public agency in the payment of budgeted funds, as is necessary, for on-the-job and/or off-the-job programs for outreach and training of minorities and women.

(D) The contractor and its subcontractors shall furnish such reports or other documents to the Division of Public Contracts Equal Employment Opportunity Compliance as may be requested by the Division from time to time in order to carry out the purposes of these regulations, and public agencies shall furnish such information as may be requested by the Division.
Division of Public Contracts Equal Employment Opportunity Compliance for conducting a compliance investigation pursuant to **Subchapter 10 of the Administrative Code at N.J.A.C. 17:27.**
IN WITNESS WHEREOF, the parties to these presents have executed this contract electronically, which shall be deemed an original, in the year and day first above mentioned.

ATTEST: for Rowan University

Witness Joseph F. Scully Jr.
Sr. VP of Finance, Chief Financial Officer

(SEAL) Contractor Date

Title

WARRANTY:

It is hereby certified and warranted by the undersigned contractor and by the undersigned principals or officers thereof, for said Contractor and for themselves, personally and individually, that no person has been employed to solicit or secure this Contract in violation of the provisions of Section 10, Chapter 48 of the Laws of 1954, N.J.S.A 52:34-15, or in violation of any other laws of the State of New Jersey; and it is further warranted that all applicable laws and regulations shall be complied with in the performance of this contract.

(SEAL) Contractor Date

By

Title

Address

City State Zip Code
**Exhibit A**

Rowan University Invitation for Bid

**PROJECT MANUAL**

**INSTRUCTIONS TO BIDDERS AND GENERAL CONDITIONS**

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<th>Section</th>
<th>Title</th>
<th>Date</th>
<th>Pages</th>
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<tbody>
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<td>Instructions to Bidders</td>
<td>July 25, 2017</td>
<td>1 through 7</td>
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<tr>
<td>II</td>
<td>General Conditions</td>
<td>July 25, 2107</td>
<td>1 through 60</td>
</tr>
<tr>
<td>III</td>
<td>Construction Contract</td>
<td>July 25, 2107</td>
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<td>Allowance Authorization Form</td>
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<td>Allowance Charge Request Form</td>
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<td>Request for Information Form</td>
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<td>Change Order Request Form</td>
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<td>Change Order Form</td>
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<td>Hourly Labor Rate Breakdown Form</td>
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<td>Daily Job Report Form</td>
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<td>Application and Certificate for Payment</td>
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<td>For Payment</td>
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<td>1 through 2</td>
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<tr>
<td></td>
<td>Contractor’s Partial or Final Release</td>
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<td>Page 1</td>
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<td></td>
<td>And Waiver of Liens</td>
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<td>Rowan Tax Exempt Letter</td>
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<td>Consent of Surety Company to Final Payment</td>
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**DIVISION 01 GENERAL REQUIREMENTS DATED July 25, 2017**

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<td>Summary of Work</td>
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<td>Work Restrictions</td>
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<td>018200</td>
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**TECHNICAL SPECIFICATIONS**
DIVISION XX
Section XXXXXX

DRAWINGS DATED
ARCHITECTURAL
MECHANICAL
ELECTRICAL
PLUMBING

END OF SECTION
## REQUEST FOR INFORMATION

**RFI No:**

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<td>Actual Response Date:</td>
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<tr>
<th>Rowan Project Manager:</th>
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<tr>
<td>Submitted to:</td>
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<tr>
<td>Company:</td>
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**Contract Document Reference:**

### RFI DISCUSSION

Individually number each separate topic or question

### RFI RESPONSE

| Submitted by (Name & Company): | Title: | Date: |

| Answered by (Name & Company): | Title: | Date: |
# Change Order Request

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<th>Contractor</th>
<th>Field</th>
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<th>Project: (name, address)</th>
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<td>Architect's Project No:</td>
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<td>Contract For:</td>
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<th>Owner: (name, address)</th>
<th>Contract Date:</th>
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<table>
<thead>
<tr>
<th>Architect: (name, address)</th>
<th>From Contractor: (name, address)</th>
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The contractor must submit this proposal with all appropriate documentation and/or notify the Architect or Owner, in writing, of the date on which proposal submission is anticipated.

**This is not a Change Order, a Construction Directive or a Direction to Proceed with the Work described in the Proposed Modifications.**

**Description:** (Insert a written description of the Work)

**Attachments:** (List attached documents that support description)

---

**Requested By The Contractor:**

(Signature)  (Printed Name and Title)
The Contract is changed as follows:

The Contract is changed as follows:

Not valid until signed by the Owner, Architect and Contractor.

Rowan University

201 Mullica Hill Road

Glassboro, NJ 08028-1701

DATE____________________________   DATE__________   DATE__________________________________
ROWAN UNIVERSITY
HOURLY LABOR RATE BREAKDOWN FORM

All Contractors (Including sub-subcontractors) need to include a detailed breakdown of all wage rates, payroll burden costs and material costs for lump sum and time and material extras. Payroll burden items, FICA, FUI, SUI, and Workmen’s Compensation will be reimbursed on an average annualized basis. **This information must be provided for all trade to be utilized on the project by any and all contractors at the time of contractors bid submission.** The required format is as follows:

Contractor: ________________________________

Address: ____________________________________________

___________________________________________

___________________________________________

Telephone: ________________________________

Prepared by: ________________________________

Trade Classification: ________________________________

Local Union No: __________________________

(If Applicable) Merit Shop_____ Union_______ (Check One)

Effective Date From__________________ To_________________

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<th>(S) Premium Cost (b-a)</th>
<th>(2x) (S) Overtime (c)</th>
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<td>8). Pension</td>
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<td>10). Annuity Fund</td>
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<td>11). Associate Dues</td>
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<td>12). Paid Holiday</td>
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<td>14). Other (Define)</td>
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<td>15). Other</td>
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<td><strong>TOTAL CHARGE PER HOUR</strong></td>
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*All rates must be at the current minimum prevailing wage rate for the State of NJ.

Please refer to the state website for further information at http://lwd.dol.state.nj.us
<table>
<thead>
<tr>
<th>CONTRACTORS ON SITE:</th>
<th>SUPER ON SITE (Y/N):</th>
<th>WORKFORCE ON SITE: (Foreman, Tradesmen, Laborers, etc.)</th>
<th>NO. OF WORKERS</th>
<th>WORK BEING DONE:</th>
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</table>

MATERIALS DELIVERED:                      EQUIPMENT ONSITE:  

PROBLEMS/STATUS/CAUSES FOR DELAY:  

NOTEWORTHY PHONE CALLS:  

DATE:  

WEATHER CONDITIONS:  

VISITORS:  

4/4/2016  8:55 AM
APPLICATION AND CERTIFICATE FOR PAYMENT

TO OWNER:  PROJECT:
FROM CONTRACTOR:  VIA ENGINEER:

CONTRACTOR'S APPLICATION FOR PAYMENT

<table>
<thead>
<tr>
<th>CHANGE ORDER SUMMARY</th>
<th>ADDITIONS</th>
<th>DEDUCTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change Orders approved in previous months by owner</td>
<td></td>
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<tr>
<td>TOTAL</td>
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<tr>
<td>Approved This Month</td>
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<tr>
<td>Number</td>
<td></td>
<td></td>
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<tr>
<td>Date Approved</td>
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</tbody>
</table>

| Net Change By Change Orders |          |            |

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:

By: ___________________________ Date: ___________________________

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising the above application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

ARCHITECT:

By: ___________________________ Date: ___________________________

AMOUNT CERTIFIED: ___________________________ $ ___________________________

(Attach explanation if amount certified differs from the amount applied for.)

This Certificate is not negotiable. THE AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

APPLICATION NO:
PERIOD TO:
PROJECT/CONTRACT NO:
APPLICATION DATE:
CONTRACT DATE:

Continuation Sheet, AIA Document G703, is attached.

1. ORIGINAL CONTRACT SUM: ___________________________
2. Net change by Change Orders: ___________________________
3. CONTRACT SUM TO DATE (LINE 1 + 2): ___________________________
4. TOTAL COMPLETED & STORED TO DATE: ___________________________
   {Column G on G703}
5. Retainage:
   a. _____% of Completed Work: ___________________________
      {Column D + E on G703}
   b. _____% of Stored Materials: ___________________________
      {Column F on G703}
   Total Retainage (line 5a + 5b or
   Total in Column I of G703): ___________________________
6. TOTAL EARNED LESS RETAINAGE: ___________________________
   {Line 4 less Line 5 Total}
7. LESS PREVIOUS CERTIFICATES FOR
   PAYMENT (Line 6 from prior Certificate): ___________________________
8. CURRENT PAYMENT DUE: ___________________________
9. BALANCE TO FINISH, PLUS RETAINAGE: ___________________________
   {Line 3 less Line 6}

State: ___________________________ County of: ___________________________
Subscribed and sworn to before me this ______ day of ______ 2010
Notary Public: ___________________________
My Commission expires: ___________________________
<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>D</td>
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<td>E</td>
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<td>I</td>
<td>J</td>
</tr>
</tbody>
</table>

**CONTINUATION SHEET**

AIA Document G702, APPLICATION AND CERTIFICATE FOR PAYMENT, containing

Contractor’s signed Certification is attached.

In tabulations below, amounts are stated to the nearest dollar.

Use Column I on Contracts where variable retainage for line items may apply.
Attachment to G702 (or equivalent)  
Certification for Payment

Project Name: ____________________________________________
Project Number: _______________  Payment Number: __________

I, ___________________________, a prime contractor working for Rowan University on the above-mentioned project, hereby certify as required by P.L. 191, c.507 of the State of New Jersey that: (you must check one under “A” and one under “B”)

A. With respect to previous progress payments:

( ) all my sub-contractors and suppliers have been paid all amounts due from all previous progress payments I have received from Rowan University for my work on this project

( ) all my sub-contractors and suppliers have been paid all amounts due from all previous progress payments with the exception of those listed below for which payment is being withheld as there exists a valid basis for those sub-contractors and suppliers listed below under the terms of their contract(s) to withhold payment from each such sub-contractor and supplier:

1. ______________________________________________

2. ______________________________________________

3. ______________________________________________

For each such sub-contractor and supplier for which payment is being withheld, I further certify that written notice detailing the specific reason(s) for withholding payment has been provided to each such sub-contractor and supplier with copies
thereof provided to my performance bond company and Rowan University.

B. With respect to this payment number: 

( ) all my sub-contractors and suppliers shall be paid all amounts due from this progress payment

( ) all my sub-contractors and suppliers shall be paid all amounts due from this progress payment with the exception of those listed below for which payment will be withheld as there exists a valid basis for those sub-contractors and suppliers listed below under the terms of their contract(s) to withhold payment from each such sub-contractor and supplier:

1. 

2. 

3. 

For each sub-contractor and supplier for which payment is being withheld, I further certify that written notice detailing the specific reason(s) for withholding payment has been provided to each sub-contractor and supplier with copies thereof provided to my performance bond company and Rowan University.

I certify that the above statements are true. I am aware that if any of the above statements are willfully false, I am subject to punishment.

Dated:_____________  
Signature  
Please Print Name  

2
CONTRACTOR’S PARTIAL OR FINAL RELEASE AND WAIVER OF LIENS

OWNER:                                     CONTRACT FOR:

OWNER’S AGENT:                               

PROJECT:                                    CONTRACT DATE:

Upon receipt by the undersigned Contractor of a check from Owner in the sum of $________, which check will consume payment of all sums due the Contractor for labor, equipment and/or materials supplied in connection with the Project, and when said check has been paid by the bank upon which it is drawn, this document shall become effective to fully and finally waive and release any and all liens, claims, liabilities, actions, and demands that this Contractor and all its subcontractors have or might have against Owner, Lender, the Project, the real property upon which the Project is located and any and all other property owned by Owner on account of or in connection with labor, equipment and/or materials supplied by the undersigned to the Project.

The undersigned Contractor does hereby further acknowledge and represent that through the date hereof the undersigned has received payments totaling $________ for labor, equipment and/or materials supplied to the Project.

This instrument has been executed as of the _______ day of __________________, 20__.

CONTRACTOR:

____________________________________

By:  __________________________________

Name:  __________________________________

Title:  __________________________________

STATE OF __________             δ
COUNTY OF _________________     δ

Sworn to and subscribed before me the undersigned authority on this ______ day of __________________, 20__.

[ S E A L ]

Notary Public, State of _________________

My Commission Expires:  

Printed Name of Notary Public
To Whom It May Concern:

Your recent request to Rowan University requesting information or a tax exempt form is hereby acknowledged.

It has been determined that Rowan University is a government body and is Exempt from New Jersey Sales and Use Taxes imposed by the Sales and Use Tax Act (P.L. 1966, c.30 and c.52). An opinion from the State of New Jersey, Office of the Attorney General has been reproduced below.

If you have any questions, please contact the Accounts Payable Office at (856) 256-4115.

Sincerely,

[Signature]
Joseph F. Scully, Jr.
Vice President for Finance & CFO

State of New Jersey
Office of the Attorney General
Department of Law and Public Safety
Division of Law
800 Haddonsfield Boulevard
P.O. Box 1002
Camden, NJ 08159-0012

May 4, 2017

Joseph F. Scully, Jr.
Vice President for Finance & CFO
Rowan University
Boile Hall
201 Mullica Hill Road
Glassboro, NJ 08028-1701

Re: Tax Exempt Status of Rowan University
Federal Tax ID: 55-0257403

Dear Mr. Scully:

You have asked this office for an opinion whether Rowan University is obligated to pay New Jersey sales and use taxes in the conduct of the University's business.

You are hereby advised that, pursuant to N.J.S.A. 54:13B-39, any sales, service or amusement charge by or to the University or any use or occupancy by the University is not subject to taxes imposed by the New Jersey Sales and Use Tax Act, N.J.S.A. 54:13B-1 et seq., to the extent the University is an arm of the State, is entitled to such consideration.

Sincerely yours,

[Signature]
Cheryl A. Ciarrocca
Deputy Attorney General

[Stamp]
CONSENT OF
SURETY COMPANY
TO FINAL PAYMENT
AIA DOCUMENT G707

PROJECT:
(name, address)

TO (Owner) __ ARCHITECT'S PROJECT NO:

CONTRACT FOR:

CONTRACTOR:

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the
there insert name and address of Surety Company

SURETY COMPANY,

on bond of there insert name and address of Contractor

, CONTRACTOR,

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not
relieve the Surety Company of any of its obligations to there insert name and address of Owner

, OWNER,

as set forth in the said Surety Company's bond.

IN WITNESS WHEREOF,
the Surety Company has hereunto set its hand this day of 2017

Surety Company

Attest:
(Signature)

Signature of Authorized Representative

Title

NOTE: This form is to be used as a companion document to AIA DOCUMENT G706, CONTRACTOR'S AFFIDAVIT OF PAYMENT OF DEBTS AND
CLAIMS, Current Edition

AIA DOCUMENT G707 • CONSENT OF SURETY COMPANY TO FINAL PAYMENT • APRIL 1970 EDITION • AIA©
© 1970 • THE AMERICAN INSTITUTE OF ARCHITECTS, 1735 NEW YORK AVE., NW, WASHINGTON, D.C. 20009.
SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1.2 SUMMARY

A. This Section includes the following:

1. Work covered by the Contract Documents
2. Use of premises.

B. Related Sections include the following:

1. Division 1 Section “Construction Facilities and Temporary Controls” for limitations and procedures governing temporary use of Owner’s premises.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification:

1. Project Location: Rowan University, Glassboro, New Jersey
   a. Westby Hall

2. Owner: Rowan University

B. Architect Identification: The Contract Documents were prepared for Project by: Clarke Caton Hintz, 100 Barrack Street, Trenton, NJ 08608.

C. The Work consists of the following:

1. BASE SCOPE: Demolition of existing glazing, stucco, courtyard finishes. Replacement of these finishes with new systems. See the Bid Documents for details.
2. ALTERNATES: See the alternate schedule and Bid Documents for details.

1.4 CONTRACT

A. Project will be constructed under a single prime general construction contract.
1.5 USE OF PREMISES

A. General Construction Operations: Contractor shall have limited use of premises for construction operations, including a limited use of the project site (outside the facilities exterior walls) during the period of construction activity. Contractor’s use of the premises is limited by Rowan’s right to perform work or to retain other contractor’s on portions of the Project or to limit access for events or other functions as the University might require. The Contractor will be given notice of any such events well in advance so that arrangements can be made to insure the prosecution of the work continues as scheduled.

B. Arrange use of site and premises to allow:

1. Owner occupancy.
2. Work by others.
3. Work by Owner.

C. Use of Site: Limit use of premises to work in areas indicated. Do not disturb portions of Project site beyond the building perimeter unless prior approval of the University is received prior to conduction such work or operations.

1. Limit site disturbance, as approved by Rowan University.
2. REFER TO SECTION 011400 FOR WORK HOURS.
3. Storage of construction materials and equipment is not permitted inside the existing building.
4. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to Rowan University, Rowan’s employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

   a. Staging areas will be allotted for usage by the Contractor near the Building. This will be limited. Deliveries need to also be allowed into the neighboring Science Building.

   b. Parking for 1 Foreman’s truck onsite will be permitted. Parking for other workers will be provided at the neighboring Business Building.

   c. Schedule deliveries to minimize use of the driveways and entrances.

   d. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

   e. Contractor may have a trash dumpster near the building. But not a storage shed on the Owner’s property.

D. Use of Existing Building: Maintain existing building in a weather tight condition throughout construction period. Repair damage caused by construction operations. Protect building and its occupants during construction period.

E. The Contractor will be responsible for photographing the entire area of work, adjacent spaces where incidental work may occur, corridors and elevators accessing the area of work, the loading area, and contractor parking area. The Contractor will provide the Owner with digital copies of all the photographs prior to mobilization as a record of the existing conditions PRIOR to the start of the work. Digital format will be in PDF format.
1.6 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Format: The Specifications are organized into Divisions and Sections using the 16-division format and CSI/CSC's "MasterFormat" numbering system.

1. Section Identification: The Specifications use section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of sections in the Contract Documents.

1.7 MISCELLANEOUS PROVISIONS

A. WORK REQUIRED TO BE PERFORMED UNDER THIS CONTRACT SHALL BE COMPLETED IN ACCORDANCE WITH THE FOLLOWING MILESTONES AND COMPLETION DATES. CONTRACTORS MUST INCLUDE IN THEIR BIDS ALL COSTS INCLUDING OVERTIME ASSOCIATED WITH INSURING THAT THE PROJECT IS COMPLETED BY THE MILESTONE DEADLINES LISTED HEREIN.

B. Summary of Milestones:

1. Notice to Proceed/Authorization by: The University intends to issue Notice to Proceed, Construction Contract, and/or University purchase order as evidence of contract award on or before May 25, 2018.
2. ALL submittals to Architect: one (1) week after Notice to Proceed.
3. Architect return of reviewed submittals by: three (3) weeks after receipt.
6. Final Completion of work on site by FIVE (5) BUSINESS DAYS FROM SUBSTANTIAL COMPLETION. All construction including punch list work will be completed by this date.
7. Final Closeout Documents by TEN (10) BUSINESS DAYS FROM SUBSTANTIAL COMPLETION DATE. All closeout documentation, final payment application, etc.

C. Weather Conditions:

1. Unfavorable weather conditions shall not be justification for delays in completion or final completion dates as specified. No change orders will be issued or approved for extensions of time due to weather conditions. Seasonal weather conditions shall be considered in the planning and scheduling of all work influenced by high or low ambient temperatures for the completion of all contract work within the allotted contract time. In addition, appropriate allowances shall be made for anticipated time losses due to normal rain and snow conditions by statistically expanding the estimated time durations for weather sensitive activities with the constraint that the substantial completion deadline cannot change.

2. The University may at its sole discretion entertain extensions of time from the contractor for weather related delays. However no extensions of time shall be considered by the University until at least twenty-five (25) lost project schedule days have accrued. Lost time will accrue on a proportionate basis – ¼ lost day will be charged as ¼ lost day, 1/2 lost day will be charged as ½ lost day, and so forth. A lost project schedule day is considered a day or any portion of a day when all members of the construction workforce on the project cannot work due to inclement weather conditions. Whether or not the contractors' workforce fails to begin work or leaves the project site on any given day due to a claim of
inclement weather a lost project schedule day will not be recognized by the University until it is approved in writing by the University's project manager.

3. Should the University approve an extension of time the contractor may only submit reimbursement for the cost of the extension of rental equipment agreements; bond premium and insurance adjustments at actual cost with no mark up; and general conditions directly impacted by the approved extension. Appropriate back up documentation as requested by the University project manager must accompany any submission for reimbursement. Appropriate back up can be anything from copies of contractor’s rental agreements showing rental durations, unit costs, rental rates, etc. to copies of superintendents pay stubs.

D. Intent of Contract: The drawings and specifications of the contract are intended to require the contractor to provide for everything reasonably necessary to accomplish the proper and complete finishing of the work. All work and materials included in the specifications and not shown on the drawings, or shown on the drawings and not in the specifications, shall be performed and/or furnished by the contractor as if described in both. Any incidental materials and/or work not specified in the drawings and/or the specifications which are, nevertheless, necessary for the true development thereof and reasonably inferable therefrom, the contractor shall understand the same to be implied and required, and shall perform all such work and furnish all such materials as if particularly delineated or described therein. Should there be an obvious error between the drawings and specifications, the most stringent constraints of the conflicting information shall be assumed by the contractor and it shall be the contractor’s responsibility to complete the work as reasonably required, consistent with the intent of such drawings and specifications as may be interpreted by the University.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000
SECTION 011400 – WORK RESTRICTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1.2 USE OF PREMISES

A. Use of Site: Limit use of premises to work in areas indicated. Do not disturb portions of site beyond areas in which the Work is indicated.

1. Limits: Confine construction operations to weekdays (Monday through Friday) from 7:00 AM to 5:00 PM. Weekend and Holiday work may be permitted if approved by the Owner.

2. Owner Occupancy: Allow for Owner occupancy of building, site and use by the public.

3. Driveways and Entrances: Keep streets, driveways and entrances serving premises clear and available to owner, Owner’s employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
   a. Schedule deliveries to minimize use of driveways and entrances.
   b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

B. Use of Existing Building: Repair damage caused by construction operations. Protect building and its occupants during construction period.

1.3 OCCUPANCY REQUIREMENTS

A. Full Owner Occupancy: Owner will occupy site and existing building during entire construction period. Cooperate with owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner’s operations.

1.4 WORK SEQUENCE

A. Work shall be completed within the schedule as outlined in Section 011000 – Summary. University intends to issue Notice to Proceed, Construction Contract, and/or University Purchase Order as evidence of contract award on or before Project start date listed.

1.5 CONTRACTOR WORK AREAS, WORKING CONDITIONS AND EQUIPMENT STORAGE REGULATIONS

A. The Contractor shall not unreasonably encumber the facilities with its equipment or work to be performed. Work conducted by the Contractor, Subcontractor, or any other person and/or firm
affiliated with the Contractor shall be contained within pre-designated working areas established by the documents.

B. The Contractor shall, at all times during the progress of the work, keep the site free from the accumulation of all rubbish and debris caused by its performance. The Contractor shall remove all debris and rubbish related to its work at the end of each workday to the satisfaction of the Project Manager. Tool storage boxes shall not be permitted inside the building on the first floor or outside the building.

C. The Contractor shall adequately secure and protect its equipment, materials and vehicles. The University assumes no liability for any damage to, or theft of, the Contractor’s property. The Contractor shall have the use of a designated area for storage and staging of construction materials and equipment. The Contractor shall be responsible for adhering to security procedures outlined by the Project Manager.

D. The Contractor is responsible for all safety precautions for all of its employees and property while performing its services.

E. The Contractor shall strictly limit its employees’ use of the facilities for lunch, smoking or rest time usage to only those areas designated by the Project Manager. Use of facility telephones will not be allowed. Use of building toilet facilities shall not be permitted. Smoking is not allowed inside the building.

1.6 WORK STOPPAGES, EXISTING UTILITY INTERRUPTIONS, NOISE AND ODOR RESTRICTIONS, AND MATERIAL APPROVALS

A. Work Stoppages – DOES NOT APPLY.

B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner not less than three (3) days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Project Manager’s written permission.

C. Consideration shall be given by the Contractor regarding odors emanating from adhesives and sealants, etc and excessive noise. If the odors or noise are such that they may disturb the employees and guests then such work shall be performed while the building is not occupied. This determination shall be at the sole discretion of the Project Manager. The playing of radios and other unnecessary noise will not be permitted at any time.

D. All material safety data sheets shall be submitted and approved by the Project Manager prior to use of the material.

1.7 PROTECTION OF INTERIOR FINISHES

A. The Contractor shall take extra care to avoid damage or soiling to any part of the facility. The Contractor is responsible for all damages or destruction caused directly or indirectly by its performance to any part of the building or adjoining property. Any damage or destruction caused by the Contractor or its employees will be repaired or replaced as the Project Manager directs and to their satisfaction with all costs charged to the Contractor. The costs may be deducted from any and all amounts due to the Contractor.
B. Any of the Contractor’s employees found defacing, damaging or marring the building or its finishes or contents shall be immediately removed by the Contractor. The Contractor shall be charged for all remedial work to restore the damaged area or contents to their original condition to the satisfaction of the State.

C. The Contractor shall take all necessary steps to ensure adequate protection of all building furniture, equipment and building finishes, including but not limited to: floors, walls, ceilings, windows, draperies, blinds, carpeting, doors, doorways and contents. In this endeavor, all workers are to take precautions to protect rugs and floors. The Contractor shall be charged for all remedial work to clean, repair and/or replace items damaged by the Contractor to the satisfaction of the State.

D. The Contractor is responsible for the cost of cleanup of dust, dirt and stains caused by the work to the satisfaction of the Project Manager. The Contractor shall take all necessary precautions to keep dust, dirt and debris to a minimum both within the construction area and throughout the buildings.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011400
SECTION 012200 – UNIT PRICES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

B. Related Requirements:
   1. Section 012500 “Contract Modification Procedures” for procedures for submitting and handling Change Orders.
   2. Section 014000 “Quality Control Requirements” for general testing and inspection requirements.

1.3 DEFINITIONS

A. Unit price is a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

A. Unit prices include all necessary material, related accessories, appurtenances, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit for installation of the product.

B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. For the plantings below, the unit price shall represent the same size and caliper as specified on the Construction Documents.
<table>
<thead>
<tr>
<th>Plants</th>
<th>Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. River Birch Multi</td>
<td>$/unit</td>
</tr>
<tr>
<td>b. Eastern Redbud</td>
<td>$/unit</td>
</tr>
<tr>
<td>c. Oakleaf Hydrangea</td>
<td>$/unit</td>
</tr>
<tr>
<td>d. Winter Jasmine</td>
<td>$/unit</td>
</tr>
<tr>
<td>e. Himalayan Sweet Box</td>
<td>$/unit</td>
</tr>
<tr>
<td>f. Arkansas Bluestar</td>
<td>$/unit</td>
</tr>
<tr>
<td>g. Common Bearberry</td>
<td>$/unit</td>
</tr>
<tr>
<td>h. Wild Ginger</td>
<td>$/unit</td>
</tr>
<tr>
<td>i. Purple Coneflower</td>
<td>$/unit</td>
</tr>
<tr>
<td>j. Wild Geranium</td>
<td>$/unit</td>
</tr>
<tr>
<td>k. Plum Pudding Coral Bells</td>
<td>$/unit</td>
</tr>
<tr>
<td>l. St. John’s Wort</td>
<td>$/unit</td>
</tr>
<tr>
<td>m. Candy tuft</td>
<td>$/unit</td>
</tr>
<tr>
<td>n. Wild Stonecrop</td>
<td>$/unit</td>
</tr>
<tr>
<td>o. Muhly Grass</td>
<td>$/unit</td>
</tr>
<tr>
<td>p. Prairie Dropseed</td>
<td>$/unit</td>
</tr>
<tr>
<td>q. Giant Allium</td>
<td>$/unit</td>
</tr>
<tr>
<td>r. Dutch Master Daffodil</td>
<td>$/unit</td>
</tr>
<tr>
<td>s. Lady Fern</td>
<td>$/unit</td>
</tr>
<tr>
<td>t. Cross Vine</td>
<td>$/unit</td>
</tr>
<tr>
<td>u. Carolina Yellow Jasmine</td>
<td>$/unit</td>
</tr>
</tbody>
</table>

END OF SECTION 012200
SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A Schedule of Alternates is included at the end of this Section. If specification Sections are referenced in alternate schedule, the specification section contains the requirements for materials necessary to achieve the work described under each alternate. If specifications are not listed in the schedule below, base the alternate price on the description below.
PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. 1: Add for landscape plantings. This includes all costs as needed to furnish and install the trees, shrubs, perennials, groundcover, grasses, bulbs, ferns, and vines as noted on the Construction Documents. The base bid should include planting soil and mulch only (see the Documents).

B. Alternate No. 2: Add for benches and tables. This includes all costs as needed to furnish and install the tables and benches shown on the Construction Documents. This does not include the stone plinths. The base bid should include removal of the existing concrete paving (see the Documents).

C. Alternate No. 3: Add for Sculptural Bench. This includes all costs as needed to furnish and install the Sculptural Bench. This includes the concrete pedestal and artificial turf associated with it (see the Documents).

D. Alternate No. 4: Add to include the special UV resistant glazing at the Art Gallery window lites only instead of the standard rated glass (see the Documents).

E. Alternate No. 5: Add to include demolition, furnish and install for the glazing systems on the North, West and South Facades. This also includes the pair of doors noted for this alternate on the East Façade, North and South Facades.

END OF SECTION 012300
SECTION 012400 – PROCEDURES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, General Conduct of the Work and Special Requirements, Supplementary Conditions, and other Division Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1.2 DESCRIPTION OF WORK

A. The types of minimum requirements for procedures and performance or control work of a general nature, to be fulfilled collectively by contractors, include but are not necessarily limited to the following categories:

1. Coordination and meetings.
2. Administration/supervisory personnel.
3. Examination and checking of contract drawings.
4. Surveys and records or reports.
5. Limitations for use of site.
6. Protection of Persons and Property.
7. Special reports.
8. Subcontractor, material approval.
10. Inspections, tests and reports.
11. Progress photographs.
13. Control Wiring.
15. Sleeves, built-in items.
16. Cutting and patching.
17. Uncovering and correction of work.
18. Cleaning and protection.

1.3 COORDINATION AND MEETINGS

A. General: Contractor shall prepare a written memorandum of general instructions on required coordination activities including notices/reports/meetings, and distribute memorandum to each engaged entity performing work at project site, with copies to Architect and Owner.

B. Coordination Drawings: Where work by separate entities requires off-site fabrication of products and materials which must be accurately interfaced and closely intermeshed to produce required results, prepare coordination drawings to indicate how work shown by separate shop drawings will be interfaced, intermeshed, and sequenced for installation.

1. Comply with submittal requirements of "Submittals" section, and other requirements outlined in the other Divisions.

C. Biweekly Job Meeting: The Contractor’s Project Manager and Superintendent, the Owner’s Project Manager and the Architect shall attend biweekly job meetings convened by the Owner.
for the purpose of affording the opportunity to review Contractor's coordination efforts, to expedite the performance of administrative tasks, and to generally assess the work progress. Contractor shall require representation (at each meeting) by every entity currently involved in coordination or planning for the work (of the entire project). Contractor shall participate in meetings in a manner, which will resolve coordination problems.

1. Time and location of job meetings shall be designated by the mutual agreement of the Contractor, Architect and Owner.
2. Job meetings shall be chaired by the Architect, who shall record the proceedings in the form of minutes and shall be responsible for proper distribution thereof to all parties. Initial minutes will be distributed within three (3) business days after the meeting.
3. Any and all corrections or clarifications to these minutes shall be received by the Architect in writing within three (3) days of their issuance. After the interval allowed for corrections and clarifications, Job Meeting Minutes will stand as part of the project record.
4. All decisions, instructions and interpretations given by Owner, with concurrence of the Architect, at these meetings shall be binding and conclusive on Contractor.
5. Architect and Owner shall have the right to schedule Special Job Meetings or increase the frequency of job meetings if, in his opinion, the progress and condition of the work warrant it. Attendance at such meetings is mandatory.
6. Subcontractors and suppliers shall attend at the request of the Architect or Owner as appropriate to the agenda topics at each meeting.
7. Agenda:
   b. Field observations, problems, and decisions.
   c. Identification of problems, which impede planned progress.
   d. Maintenance of Progress Schedule- updated by Contractor and discussed at every meeting.
   e. Corrective measures to regain projected schedule milestones and deadlines.
   f. Planned progress during succeeding work period and two (2) week look ahead.
   g. Effect of proposed changes on progress schedule and coordination.
   h. Review and update Submittal Log for every meeting.
   i. Other business relating to the Work.

D. Pre-Construction Meeting: Owner will schedule a meeting after Notice of Award.

1. Attendance Required:
   a. Owner.
   b. Architect.
   c. Contractor.

2. Agenda:
   a. Execution of Owner/Contractor Agreement.
   b. Submission of executed bonds and insurance certificates.
   c. Distribution of Contract Documents.
   d. Submission of list of Subcontractors, list of Products, schedule of values, etc.
   e. Procedures and processing of field decisions, submittals, substitutions, applications for payment, proposal requests, Change Orders, and Contract closeout procedures.
   f. Scheduling (Preliminary Progress Schedule by Contractor).
The above Agenda is a comprehensive list of items that could be discussed at the Pre-Construction Meeting. Some items will be included while the Owner may choose to handle other items by other means.

3. Architect will record minutes and distribute copies within two (2) days after meeting to participants, with two copies to Contractor, Owner, and those affected by any decisions made.

E. Pre-Installation Conferences:

1. When required by individual specification sections, contractor shall convene a pre-installation conference prior to the start of installation for the portion of work in question.
2. Require attendance of all Subcontractors, suppliers, manufacturers (if necessary), Owner Architect (at the Owners request), Engineers (at the Owners request) directly affecting or affected by the Work in question.

F. Application for Payment “PENCIL COPY” review meeting:

1. Contractor to schedule a Pencil Copy Review Meeting five (5) working days prior to payment period deadline stipulated in the Agreement.
2. Contractor will be responsible to incorporate all agreed upon changes to the Pencil Copy version of the Application and submit the revised Application in accordance with all Contract requirements.

1.4 ADMINISTRATIVE/SUPERVISORY PERSONNEL

A. General: In addition to a Home Office Project Manager and a Field Construction Superintendent and other administrative and supervisory personnel required for performance of the work, the Contractor shall provide specific coordinating personnel as may be required for proper interface between the trades and other work of the total project.

B. Project Superintendent: The Contractor shall provide a full-time Project Superintendent, who is experienced in administration and supervision of building construction of a type similar in nature and scope to this Project, including mechanical and electrical work, and who is hereby authorized to act as the general coordinator of interfaces between the work of all the trades. For purpose of this provision, “interface” is defined to include the scheduling and sequencing of work, sharing of access to work spaces, installations, each trade’s protection of work by other trades, cutting and patching, tolerances, preparation of coordination drawings, inspections, tests, and temporary facilities and services.

C. Submittal of Staff Names, Duties: Within 15 days of contract date, the Contractor shall submit to the Owner and Architect a listing of Contractor's principal staff assignments and consultants, naming persons and listing their addresses, telephone numbers and past construction experience.

1.5 EXAMINATION AND CHECKING OF CONTRACT DOCUMENTS

A. Contractor shall be responsible for reviewing the contract documents in accordance with the requirements specified herein.

1. Contractor shall examine and check all quantities and dimensions given on contract drawings, and shall be responsible for noting any errors which can be discovered by
such examination and check, and shall be responsible for satisfactory joining and fitting of all parts of the work; any check or observation by Architect/Engineer shall not relieve the Contractor of any responsibility as to correctness of the work.

2. Field verification of dimensions on drawings is specifically directed and required of the Contractor as a matter of course, because locations, distances and elevations will be governed by actual field conditions. Contractor shall review plans, site plans and details of construction on the drawings, and adjust his work to conform to all conditions indicated thereon or reasonably inferable therefrom.

3. Discrepancies shown on different plans and details, or between drawings, and actual field conditions, or between drawings and specifications, shall promptly be brought to the attention of the Architect for interpretation and resolution.

4. If, in Contractor's opinion, any work is indicated on drawings or specified in such a manner as will make it impossible to produce such in conformance with the contract, he shall refer same to Architect for interpretation. If additional and supplementary instructions are necessary, Architect/Engineer will prepare and issue same in an appropriate form to the Contractor, with a copy being forwarded to the Owner.

5. Contractor is directed never to scale dimensions or locations from contract drawings. Consult Architect/Engineer for dimensions and locations of all items.

1.6 SURVEYS AND RECORDS/REPORTS

A. General: Working from lines and levels established by property survey, and as shown in relation to the work, the Contractor shall establish and maintain bench marks and other dependable markers to set lines and levels for the work at each story of construction and elsewhere on site as needed to properly locate each element of entire project. Contractor shall calculate and measure required dimensions as shown (within recognized tolerances if not otherwise indicated); and shall not scale drawings to determine dimensions. Advise tradesmen performing the work, of marked lines and levels provided for their use in layout of work.

1.7 LIMITATIONS FOR USE OF SITE

A. General: It is the intent of the Owner to preserve the present character of the campus to the greatest extent possible, both during and after the period of construction. To this end the Contractor will be subject to certain operational controls in the movement of personnel and equipment on and off the construction site. The Contractor's cooperation with the general goal of protecting and preserving the Institute campus, and with the specific controls specified hereinafter, shall be mandatory. The following general controls shall be observed:

1. Construction activities, including location of temporary support facilities, stockpiling of materials, loading and unloading, parking for construction personnel and other related activities shall be restricted to areas as specified by the Owner.

2. The accumulation or stockpiling of debris, rubbish or other material resulting from demolition or construction operations will not be permitted. Removal and off-site disposal must proceed concurrent with demolition and construction activities, to the end that the site shall at all times present a neat, orderly and workmanship appearance. No liquid or solid material of any kind is to be disposed of on campus property. No burning of trash or debris will be permitted on the site.

3. The Contractor shall be responsible for the prevention, abatement and control of any environmental pollution arising from demolition or construction activities in the performance of the work, in full compliance with all applicable Federal and State laws and regulations.

   a. Existing trees and other vegetation on and adjacent to the project site shall be
protected. Refer to Section 015000 - "Temporary Facilities" - for specific requirements concerning fencing. Under no circumstances shall materials be stored or heavy equipment operated beneath the drip lines of existing trees.

4. Contractor shall be responsible for the control of dust arising from demolition or construction operations within the project site or along the Access Routes.

B. Allocation of Space: In addition to site utilization limitations and requirements shown on drawings, and indicated by other contract documents, Contractor shall administer allocation of available space equitably among separate subcontractors and other entities needing access and space, so as to produce overall efficiency in performance of total work of project.

C. Deliveries: Contractor shall schedule deliveries so as to minimize space and time requirements for storage of materials and equipment on site.

D. Construction Access:

1. Contractor shall plan, coordinate and execute all construction activities in such manner as to avoid traffic disruption over local streets.
   a. Prior to the start of work, Contractor shall contact the Police Department and determine approved travel routes for delivery vehicles on local streets.
   b. Contractor shall obtain and pay for all necessary permits in connection with the operation of overweight and over length vehicles on City streets.

2. Contractor shall be responsible for controlling all traffic entering and leaving the Owner's property including provision of flagmen as necessary. Contractor shall be responsible to require mud removal from rubber-tired vehicles departing the immediate project site. Operation of tracked vehicles shall be restricted to the project site as defined by the contract limit lines, and is not permitted on paved areas.

3. Whenever and wherever the project work must be performed outside the contract limit lines, and after the necessary permits have been secured from local authorities, Contractor shall erect and maintain barricades, danger signals and warning signs at working sites, closed roads, intersections and other places of danger to traffic, the work, or the public. Barricades and obstructions of any kind shall be marked with lights or flares at not more than five (5) foot intervals visible for a distance of not less than 500 feet. Contractor shall provide sufficient watchmen and traffic directors and shall take all necessary precautions for the proper protection of the work and the safety of the public.

4. Contractor shall be responsible for identification, control and maintenance of construction traffic within the contract limit lines. Identification and control shall include the provision of temporary traffic signs and the installation of barricades and warning lights to protect the work and to identify excavations or other hazards, all as may be required. Maintenance shall include the provision and placing of ballast materials as may be required, grading and compaction, removal of debris, removal of snow, and general care to insure a serviceable roadbed at all times.
   a. The Owner shall be responsible for snow removal from paved roadways and parking lots in the vicinity of the project area, but not within the work areas or areas immediate to the Contractor's temporary facilities.

5. Prior to final completion, perform all cleaning and repairs as necessary to restore all existing areas within the limits of any and all work required as a part of the scope of these contract documents, to their original condition.
E. Temporary Parking for Construction Personnel: The Owner shall designate available areas for parking.

1. Offsite parking will be available for employee parking, in an area to be designated by the Owner on RUI property. Construction personnel will not be permitted to park in campus parking lots, except as specifically designated and authorized by the Owner. The designated parking area may change due to seasonal demands of the Owner.

F. Staging and Storage Area: The Contractor shall have the authority and responsibility to plan and locate storage areas, equipment marshaling areas, and temporary field facilities. Staging and storage areas shall be so located and utilized as to afford unrestricted access to all of the work at all times. Such areas shall not encroach upon access routes to the work, nor shall they be so located or utilized as to impede free access of emergency vehicles. Such areas must be approved by the Owner prior to use by the contractor.

1. Staging and storage areas shall be located wholly within the contract limit lines and site enclosure fence.
2. All loading and unloading operations shall occur inside the contract limit lines and behind the site enclosure fence.
3. Storage of materials and equipment outside the site enclosure fence or on City streets is absolutely prohibited.
4. Prior to final completion, perform all cleanup, disposal, grading, topsoiling, seeding and other work as necessary to restore the entire staging/storage area to its original condition.

G. Verification of Underground Utilities: Contractor shall have the responsibility to verify the actual locations of existing underground utility lines. Should verified underground utility locations conflict with excavation required in connection with the work, Contractor shall notify the Owner's project manager immediately. Hand excavation shall be required at locations in close proximity to verified existing utilities.

1. The Owner does not guarantee the accuracy and completeness of information shown on any contract drawings for underground utilities; Contractor must be responsible for ascertaining all facts concerning utility locations.
2. Damage to existing underground utilities, caused as a result of Contractor's negligence or failure to comply with the requirements listed herein, shall be repaired and/or replaced at Contractor's expense, to the complete satisfaction of the Owner and utility company by close of business of the day of damage.

H. Cleaning and Trash Disposal: Comply with requirements specified in Section 01500, "Temporary Facilities".

1.8 PROTECTION OF PERSONS AND PROPERTY

A. Safety Precautions and Programs: Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work. He shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent, unless otherwise designated by the Contractor, in writing, to the Owner.

B. Protection of Persons: Contractor shall take all necessary precautions for the safety of employees on the work, and shall comply with all applicable provisions of Federal and State safety laws, union safety regulations, and building codes to prevent accidents or injury to
persons on, about or adjacent to the premises where the work is being performed. Particular attention is called to the requirements of the Federal Occupational Safety and Health Act (OSHA). In connection with the work of its own forces, Contractor shall direct and properly maintain, at all times, as required by the conditions and progress of the work, all necessary safeguards for the protection of workers and the public and shall post danger signs warning against the hazards created by such features of construction as protruding nails, hoists, well holes, elevator hatchways, scaffolding, window openings, stairways and falling materials.

1. Security/protection provisions are specified in "Temporary Facilities" section.

C. Protection of Work and Property: Contractor shall take all precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury or loss to:

1. All the work and all materials and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody or control of the Contractor or any of his Subcontractors, or Sub-subcontractors; and
2. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

   a. Refer to "Temporary Facilities" section for specific requirements concerning fencing around existing trees.

D. Emergencies: In any emergency affecting the safety of persons or property, Contractor shall act with diligence, at his discretion, to prevent threatening injury, damage or loss. In such case, he shall immediately notify the Owner, of the action taken and shall forthwith prepare and submit a detailed and documented report to the Owner and the Architect.

E. Insurance and Indemnification: Comply with requirements of the Contract Agreement.

1.9 SPECIAL REPORTS

A. General: Except as otherwise indicated, submit special reports directly to Owner within one day of occurrence requiring special report, with copy to Architect/Engineer and others affected by occurrence.

B. Reporting Unusual Events: When an event of unusual and significant nature occurs at site, the Contractor shall prepare and submit a special report listing chain of events, persons participating, response by Contractor's personnel, evaluations of results or effects, and similar pertinent information. When such events are known or predictable in advance, it is the responsibility of the Contractor to advise the Owner in advance at earliest possible date.

C. Reporting Accidents: Contractor shall prepare and submit reports of significant accidents, at site and anywhere else work is in progress. Record and document data and actions; comply with industry standards. For this purpose, a significant accident is defined to include events where bodily injury is sustained, or property loss of substance is sustained, or where the event posed a significant threat of loss or personal injury.

1.10 SUBCONTRACTOR, MATERIAL APPROVAL

A. Material Approval: Contractor shall submit to the Owner and Architect, for approval, a list of all vendors and manufacturers for the supply of materials and equipment, whether specified or not, starting within fifteen (15) calendar days after award of contract; said list shall be complete
within forty-five (45) days thereafter. In instances where specified materials and equipment are subject to the Owner’s and Architect's approval by way of the submittal process, no contract shall be entered into with any vendor, supplier or manufacturer before the Owner and Architect have approved his name in writing.

B. Subcontractor Approval: Contractor shall, beginning within fifteen (15) calendar days after award of contract and ending within forty-five (45) days thereafter, notify the Architect and Owner in writing of the names of all subcontractors proposed for the work, and shall not employ any without prior written approval of the Owner, or any that Owner may within a reasonable time reject.

1.11 TRADESMEN AND WORKMANSHIP STANDARDS

A. General: Contractor shall instigate and maintain procedures to ensure that tradesmen performing work at site are skilled and knowledgeable in methods and craftsmanship needed to produce required quality-levels for workmanship in completed work. Remove and replace work, which does not comply with workmanship standards as specified and as recognized in the construction industry for applications indicated. Remove and replace other work damaged or deteriorated by faulty workmanship or its replacement.

B. Availability of Tradesmen: At each progress or job meeting, Contractor shall review availability of tradesmen and projected needs to accomplish work as scheduled. Require each entity employing tradesmen to report on current and pending trade actions and jurisdictional matters, which might affect progress of work. Where possible dispute or delay is identified, consider alternatives and take actions to avoid disputes and delays.

C. Labor Peace Clause:

1. The Contractor agrees that in the performance of the work called for under these Contract Documents, it will employ only such labor as will not delay or interfere with the speedy and diligent progress of the project and as will be acceptable to and work in harmony with all other workmen employed by the Owner.

2. In the event of labor difficulties (including, but not limited to, strikes, walkouts, picketing, boycotts, shutdowns, or inability to obtain a sufficient number of competent laborers or mechanics), which interfere with the work, or any part thereof, it shall be the responsibility of the contractor to take all measures necessary and possible to insure the projects progress and completion as prescribed by the time schedule including, but not limited to, seeking injunctive relief in an appropriate Court of Common Pleas, filing an unfair labor practices charge(s) with the National Labor Relations Board, discharging employees who engage in an unprotected strike or work stoppage, or any other applicable legal or equitable action related to the aforesaid labor difficulty which occurs in connection with the performance of this contract.

3. In the event of a strike or stoppage of work resulting from a dispute involving or affecting the labor employed by the contractor (including subcontractors and suppliers), the Owner may, at its option, terminate this contract. However, where practicable the contractor will give subcontractors 24 hours to resolve the strike or stoppage of work before terminating its contract. In the event there is a conflict between this clause and any other agreement between contractor and the Owner, including but not limited to other provisions of this contract, other written agreements and verbal agreements, this clause will take precedence. In the event of such termination, the Owner shall have the right to take possession, for the purpose of completing such work, of all materials, tools, and appliances on its premises and employ any person or persons to finish the work and provide the materials and labor for such work. The Contractor shall not be entitled to
receive any further payments under this agreement until the work shall be finished completely, at which time the contractor shall be paid whatever balance is found to be due to contractor for amounts expended by it either for labor, materials, or otherwise, plus contractors percentage of profit as provided in this agreement, less, however such expenses or damages as the Owner may suffer by so completing the work. The Contractor shall not be entitled to prospective profits on portions of the project not performed by it or with respect to the materials not furnished by it. Further, it is understood and agreed that should the expenses to the Owner in completing the contract be increased by reason of such discontinuance of the services of this contractor, then this contractor shall be responsible to the Owner for such entire increase in addition to the other expenses or damages referred to above.

1.12 INSPECTIONS, TESTS AND REPORTS

A. General: Required inspection and testing services are intended to assist in determination of probable compliances of the work with requirements, but do not relieve Contractor of responsibility for those compliances, or for general fulfillment of requirements of contract documents. Specified inspections and tests are not intended to limit Contractor's quality control program. Afford reasonable access to agencies performing tests and inspections.

B. Inspection and Testing by Independent Agencies: General requirements are specified in "Quality Control Services" section of these specifications (Section 01400). Particular requirements are specified in the technical sections (Divisions 2 through 16).

C. Inspection and Testing by Authorities with Jurisdiction: If the Contract Documents, laws, ordinances, rules, regulations or order of any public authority having jurisdiction require any portion of the Work to be inspected, tested or approved, the Contractor shall give the Owner not less than five (5) working days notice in writing of its readiness for inspections or testing. The Contractor shall bear all costs of such inspections, tests or approvals conducted by public authorities.

D. Inspection and Testing by Contractors: When inspections and tests are required by the technical sections of these specifications to be performed by Contractors on installed materials and equipment, all such inspections and tests shall be conducted in the presence of, and upon timely notice to, the Owner, and the results thereof approved prior to acceptance of the installation. Fuel, power and any other items or services required for the proper inspecting and testing of equipment and for the period of instructing the Owner's operating personnel shall be at the cost and expense of the Contractor furnishing such equipment.

E. Special Inspection and Testing: If the Owner or Architect/Engineer determines that any Work requires special inspection, testing or approval, not otherwise required herein, he will instruct the Contractor to order such special inspection, testing or approval, and the Contractor shall give notice as provided in subparagraph C. If such special testing or inspection reveals a failure of the Work to comply with the requirements of the Contract Documents, the Contractor shall bear all costs thereof, including compensation for the Architect/Engineer's additional services made necessary by such failure; otherwise the Owner shall bear all costs and an appropriate Change Order will be issued.

1.13 PROGRESS PHOTOGRAPHS

A. Refer to Specification Section 01300, "Submittals" for requirements pertaining to Progress Photographs.
B. Provide photographs of the site and construction throughout progress of Work produced by an experienced photographer or job superintendent experienced in taking construction photographs, acceptable to the Owner.

C. Take photos in a timely fashion to allow for their submission with each application for a payment and as follows (as applicable):

1. Installation of site utilities.
2. Installation of footings.
3. Installation of foundations.
4. Building pad proof roll.
5. Building pad sub grade (vapor barrier and stone).
6. Installation of concrete floors, decks, walls, etc.
7. Installation of masonry for stair towers, elevator, exterior walls, etc.
8. Installation of structural steel, steel deck and joist, etc.
9. Rough grading.
10. Installation of parking lot paving, parking lot lighting, line stripping, etc.
11. Installation of interior and exterior framing.
13. HVAC ductwork and units.
15. Installation of roofing.
16. Installation of windows, doors, hardware, etc.
17. Enclosure of walls and ceilings.
18. Interior and exterior finishes.
19. Installations of millwork, casework, trim work, etc.
20. Landscaping
21. Final Completion.

D. Digital PDFs: Color; three (3) prints of each view. 4” X 8” or larger of each view. Provide enough photos at each stage of construction to give someone not familiar with the Project a clear understanding of the progress of the work. Review photos with the Owner’s representative at each stage of construction requiring photographs. The Owner will determine if additional photos will be needed.

1. PDF format.
2. Identify each print. Identify name of Project, orientation of view, date and time of view.

E. Deliver prints with each Application for Payment or at times specified by Owner with transmittal letter.

PART 2 - PRODUCTS (not applicable)

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION PROVISIONS

A. Pre-Installation Conference: Well in advance of installation of every major unit of work which requires coordination and interfacing with other work, Contractor shall meet at project site with subcontractors, installers and representatives of manufacturers and fabricators who are involved in or affected by unit of work, and in its coordination or integration with other work which has preceded or will follow. Contractor shall advise Owner and Architect of scheduled meeting dates. At each meeting review progress of other work and preparations for particular work under consideration, including requirements of contract documents, options, related
change orders, purchases, deliveries, shop drawings, product data, quality control samples, possible conflicts, compatibility problems, time schedules, weather limitations, temporary facilities, space and access limitations, structural limitations, governing regulations, safety, inspection and testing requirements, required performance results, recording requirements, and protection. Contractor shall record significant discussions of each conference, and agreements and disagreements, along with final plan of action. Distribute record of meeting promptly to everyone concerned, including Architect/Engineer and Owner.

1. Do not proceed with the work if associated pre-installation conference cannot be concluded successfully. Instigate actions to resolve impediments to performance of the work, and reconvene conference at earliest date feasible.

B. Installer's Inspection of Conditions: Require Installer of each major unit of work to inspect substrate to receive the work, and conditions under which the work will be performed, and to report (in writing to Contractor) unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

C. Manufacturer's Instructions: Where installations include manufactured products, comply with manufacturer's applicable instructions and recommendations for installation, to whatever extent these are more explicit or more stringent than applicable requirements indicated in contract documents.

D. Inspect each item of materials or equipment immediately prior to installation, and reject damaged and defective items.

E. Provide attachment and connection devices and methods for securing work properly as it is installed; true to line and level, and within recognized industry tolerances if not otherwise indicated. Allow for expansions and building movements. Provide uniform joint widths in exposed work, organized for best possible visual effect. Refer questionable visual-effect choices to Architect for final decision.

F. Recheck measurements and dimensions of the work, as an integral step of starting each installation.

G. Install work during conditions of temperature, humidity, exposure, forecasted weather, and status of project completion, which will ensure best possible results for each unit of work, in coordination with entire work. Isolate each unit of work from non-compatible work, as required to prevent deterioration.

H. Coordinate enclosure (closing-in) of work with inspections and tests, so as to minimize necessity of uncovering work for that purpose.

I. Mounting Heights: Except as otherwise indicated, mount individual units of work at industry-recognized standard mounting heights, for applications indicated. Refer questionable mounting height choices to Architect/Engineer for final decision.

3.2. The contractor shall include in his/her proposal the cost of all control wiring and its installation for all mechanical equipment including, but not limited to, heating, ventilating and air conditioning systems, ATC systems, boilers, remote monitoring systems, etc. which systems require electrical control wiring. The contractor shall employ a sub-contractor approved by the University for all such control wiring. The sub-contractor shall provide a final certificate of electrical inspection of the control wiring. Installed or control wiring must connect to a point of electrical power supply as shown on the contract documents.
3.3 CHASES, RECESSES AND OPENINGS

A. Contractor shall build chases, recesses, openings, channels and flues, and shall leave or create holes where shown on drawings, or where directed for piping, electrical conduits, switchboxes, panelboards, flues and ducts, or any other feature of the mechanical and electrical work. All trades requiring chases, recesses, openings, etc. shall furnish to the Contractor, complete detailed drawings for all chases, recesses and openings required in connection with such work in ample time to allow the construction to proceed without interruption or delay. Comply with requirements of “Submittals” section of these specifications.

1. Contractor shall close, build in and finish around or over all chases, recesses, openings, etc. after installation of mechanical and electrical work has been completed. Should any fail to furnish the above required information in time, he shall, at his own expense, arrange for all cutting, rebuilding, patching and finishing, but shall employ the Contractor whose work must be cut to do so.

2. Contractor shall obtain prior written approval from the Architect/Engineer and the Owner before cutting or boring through beams, floor construction or supporting members.

3.4 SLEEVES, BUILT-IN ITEMS

A. Each trade shall be responsible for furnishing and setting of sleeves, built-in items, anchors, inserts, etc. for his work. Contractor shall build these items into the construction.

1. Comply with requirements of “Submittals” section in the preparation of sleeve drawings.

3.5 CUTTING AND PATCHING

A. General: Do not cut-and-patch structural work in a manner resulting in reduction of load-carrying capacity or load/deflection ratio; submit proposed cutting and patching to Architect/Engineer for structural approval before proceeding. Do not cut-and-patch operational elements and safety-related components in a manner resulting in reduction of capacities to perform in manner intended or resulting in decreased operational-life, increased maintenance, or decreased safety. Do not cut-and-patch work which is exposed on exterior or exposed in occupied spaces of building, in a manner resulting in reduction of visual qualities or resulting in substantial evidence of cut-and-patch work, both as judged solely by Architect. Remove and replace work judged by Architect to be cut-and-patched in a visually unsatisfactory manner.

1. Contractor shall do all cutting, fitting, adjusting and patching as may be required to permit the several parts to properly come together as intended and indicated.

2. Engage original Fabricator/Installer to perform cutting-and-patching of structural work, operational/ safety-related components, and visually exposed work; or, if not available, engage only recognized experts; employ only proven methods.

3. Do not cut or alter work performed under separate contracts without the Architect’s written permission.

4. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specific requirements and methods needed for proper performance of the work of this Section.

5. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Beginning new work means acceptance of existing conditions.

6. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

7. Examine and verify specific conditions described in individual specification sections.

8. Verify that utility services are available, of the correct characteristics, and in the correct
locations.

9. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

B. Materials: Except as otherwise indicated or approved by Architect/Engineer, provide materials for cutting-and-patching which will result in equal-or-better work than work being cut-and-patched, in terms of performance characteristics and including visual effect where applicable. Use materials identical with original materials where feasible and where recognized that satisfactory results can be produced thereby.

C. Temporary Support and Protection: Provide adequate temporary support for work to be cut, to prevent failure. Do not endanger other work. Provide adequate protection of other work during cutting-and-patching, to prevent damage; and provide protection of the work from adverse weather exposure.

D. Cut work using methods least likely to damage work to be retained and work adjoining.

1. Where physical cutting action is required, cut work with sawing and grinding tools, not with hammering and chopping tools. Core drill openings through concrete work. Comply with the requirements of applicable sections of Division 2 where cutting-and-patching requires excavating and backfilling.

2. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

3. At penetrations of fire rated walls, partitions, ceilings, or floor construction, completely seal voids with fire rated materials in accordance with Section 07841 to full thickness of the penetrated elements.

4. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

E. Patch with seams, which are durable and as invisible as possible. Comply with specified tolerances for the work.

1. Where feasible, inspect and test patched areas to demonstrate integrity of work.

F. Restore exposed finishes of patched areas; and, where necessary extend finish restoration onto retained work adjoining, in a manner, which will eliminate evidence of patching.

1. Where patch occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing patch, after patched area has received prime and base coats.

G. Execute cutting and patching including excavation and fill to complete the work, to uncover work to install improperly sequenced work, to remove and replace defective or non-conforming work, to remove samples of installed work for testing when requested, to provide opening in the work for penetrations of mechanical and electrical work, to execute patching to complement adjacent work, and to fit Products together to integrate with other work.

H. Execute work by methods to avoid damage to other work, and which will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original conditions.
I. ALL CUTTING AND PATCHING SHALL BE CONSIDERED PART OF THE BASE BID PRICE WHEN THE WORK IS REQUIRED AS PART OF THE OVERALL PROJECT. NO ADDITIONAL PAYMENT WILL BE CONSIDERED FOR WORK OF THIS SECTION UNLESS ALL APPLICABLE PARTIES OBTAIN PRIOR AUTHORIZATION OR WRITTEN APPROVAL.

3.6 UNCOVERING AND CORRECTION OF WORK

A. Comply with requirements of the General Conditions of the Contract, and with additional requirements specified herein.

1. Subsequent Disclosure of Faulty Work: Failure of Owner or Architect/Engineer to exercise powers of rejection or condemnation against the work of the Contractor during construction shall not be construed as an acceptance on Owner's part or Architect/Engineer's part that Contractor's work has been faithfully performed, if the fact be otherwise.

3.7 PROJECT CONDITIONS

A. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

B. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

C. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and air from discharge of noxious, toxic substances, and pollutants produced by construction activities. Comply with all governmental and code requirements.

3.8 PREPERATION FOR CUTTING AND PATCHING AND/OR NEW WORK.

A. Prepare surfaces and remove surface finishes to provide for proper installation of work and finishes.

B. Clean substrate surfaces prior to applying next material or substance.

C. Seal cracks or openings of substrate prior to applying next material or substance.

D. Apply manufacturers required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.9 LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Owner’s Representative and Architect of any discrepancies discovered.

C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

D. Promptly report to Architect/Engineer and Owner’s Representative the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

E. Utilize recognized engineering survey practices.
F. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:

1. Site improvements including but not limited to pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations, etc.
2. Building foundation, column locations, all floor elevations, stairwells, elevator shafts, machine and mechanical rooms, etc.
3. All other work as necessary to complete all the requirements of the contract documents.

G. Periodically verify layouts by same means.

H. Maintain a complete and accurate log of control and survey work as it progresses.

3.10 GENERAL INSTALLATION REQUIREMENTS

A. Install Products as specified in individual sections and in accordance with manufacturer’s recommendations.

B. Make neat transitions. Patch work to match adjacent work in texture and appearance. Where new Work abuts or aligns with existing, perform a smooth and even transition.

C. When existing finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendations to the Architect and Owner.

3.11 CLEANING AND PROTECTION

A. General: During handling and installation of work at project site, Contractor shall clean and protect work in progress and adjoining work on a basis of perpetual maintenance. Apply suitable protective covering on newly installed work where reasonably required to ensure freedom from damage or deterioration at time of substantial completion; otherwise, clean and perform maintenance on newly installed work as frequently as necessary through remainder of construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

B. Removal of all debris and rubbish resulting from or relating to the construction work; rubbish shall not be thrown from building openings above the ground floor unless confined within chutes.

1. Progress Cleaning:

   a. Maintain areas free of waste material, debris, and rubbish (on a daily basis). Maintain site in a clean and orderly condition, as determined by the Owner.
   b. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
   c. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
   d. Collect and remove waste materials, debris, and rubbish from site periodically and dispose of off-site.
   e. Protect installed work and provide special protection where specified in individual specification sections.
   f. Provide temporary and removable protection for installed Products. Control activity during and after installation in the immediate work area to prevent damage.
g. Protect finished floors and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials appropriate for the task involved.

C. Limiting Exposures of Work: To extent possible through reasonable control and protection methods, Contractor shall supervise performance of work in a manner and by means which will ensure that none of the work, whether completed or in progress, will be subjected to harmful, dangerous, damaging, or otherwise deleterious exposures during construction period. Such exposures include (where applicable, but not by way of limitation) static loading, dynamic loading, internal pressures, external pressures, high or low temperatures, thermal shock, high or low humidity, air contamination or pollution, water, ice, solvents, chemicals, light, radiation, puncture, abrasion, heavy traffic, soiling, bacteria, insect infestation, combustion, electrical current, high speed operation, improper lubrication, unusual wear, misuse, incompatible interface, destructive testing, misalignment, excessive weathering, unprotected storage, improper shipping/handling, theft and vandalism.

D. Construction Debris: The Contractor shall intermittently remove waste and rubble so that at no time shall there be undue accumulations. Upon completion, the Contractor shall dress up all areas affected by this work whether inside or outside the boundary of the Project. Loading, crating, hauling and dumping will be at the contractor's expense.

E. Rubbish: The Contractor shall provide covered metal trash cans in sufficient quantity to accept the accumulation of rubbish and garbage from lunch and the like of employees of all Contractors working on site.

1. The Contractor shall instruct his and his subcontractors’ employees to deposit their trash and garbage in these containers and not elsewhere about the site; and also not to use the containers for construction scraps, rubbish, trash and surplus materials.

2. The Contractor shall empty these containers daily and haul the rubbish to a legal disposal site off the property.

F. Roads and Pathways:

1. The Contractor is responsible for the removal of construction dirt and debris in public areas on the site and in the surrounding areas serving the site.

2. Dirt and mud tracked onto streets by the Contractor or its subcontractors is to be immediately cleaned up by the Contractor to the satisfaction of the Owner and the local municipal authorities.

G. Trucks: All trucks leaving the construction area are to be covered in accordance with NJDOT over the road requirements. Trucks leaving the site are to be clean and free of mud or other materials.

H. Quality Assurance: University streets and pathways are to be maintained in a clean safe condition at all times. Under no circumstances shall the Contractor leave the site each day without inspecting and verifying that streets and paths to the construction site, access areas, lay down areas, and gates in the area of the site are clean of all construction related materials and are clean and sage for use by the Rowan University population. The Contractor will immediately correct any violation of this provision upon notification by the Owner.

3.12 CONSERVATION AND SALVAGE

A. General: It is a general procedural requirement for Contractor's supervision and administration
of the work that construction operations be carried out with maximum practical consideration for conservation of energy, water and materials; and with maximum practical consideration for salvaging materials and equipment involved in performance of the work but not incorporated therein.

END OF SECTION 012400
SECTION 012500 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1.2 SUMMARY

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

B. Related Sections include the following:

1. Division 1 Section "Allowances" for procedural requirements for handling and processing allowances.
2. Division 1 Section "Unit Prices" for administrative requirements for using unit prices.
3. Division 1 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.3 MINOR CHANGES IN THE WORK

A. Architect may issue through Owners project manager supplemental instructions authorizing Changes in the Work, not involving adjustment to the Contract Time, as “Architects Supplemental Instructions” (ASI). Architects Supplemental Instructions may or may not involve adjustments to the contract sum. THERE WILL BE NO ADJUSTMENTS TO THE CONTRACT TIME ALLOWED FOR THIS PROJECT.

1. For ASI’s involving no adjustment to the contract sum or time, the contractor is authorized to execute the change or clarification immediately.
2. For ASI’s resulting in an adjustment to the contract sum, do not consider them instructions either to stop work in progress or to execute the proposed change without obtaining written authorization from the Owner. Written authorization can include the provisions of the general conditions, Article 14, paragraphs 14.5.3 and 14.7.1, an approved change order or a Construction Change Directive.

1.4 PROPOSAL REQUESTS

A. In the event the Contractor believes that any change directed by the Owner or Architect would entitle it to additional compensation to complete its work under this contract, the Contractor shall immediately notify the Owners project manager of this fact WITHIN 48 HOURS OF RECEIPT OF THE CHANGE REQUESTED. The contractor shall then prepare and submit an original of the Change Order Request (COR) with all supporting documentation to the Owners project manager and submit two (2) copies of the Change Order Request (COR) with all supporting documentation to the Architect and University within five (5) calendar days of its receipt of the directive by the Owner and/or Architect.

B. Owner-Initiated Proposal Requests: Owner may issue proposal requests or may have the
Proposed Requests issued by Architect are for information only. For ASI’s resulting in adjustments to the contract sum, do not consider them instructions either to stop work in progress or to execute the proposed change without first obtaining written authorization from the Owner.

2. If the contractor feels the ASI or proposal request requires a change to the contract sum then the contractor shall notify the Owners project manager of this fact within 48 hours of receipt of the ASI or OIPR directive.

3. Within five (5) business days after receipt of directive, ASI or proposal request from the Owner, submit a Change Order Request estimating cost adjustments to the Contract Sum necessary to execute the change. The contractor shall then prepare and submit an original of the Change Order Request (COR) with all supporting documentation to the Owners project manager and submit two (2) copies of the COR with all supporting documentation to the architect.

   a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

   b. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.

   c. Include costs of labor directly attributable to the change.
      1) Labor shall be broken down by man-hours, hourly wages, fringe benefits per hour and any other benefits payable.

   d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float however the date of Substantial and Final Completion cannot be extended.

C. In the event that the Contractor encounters a condition that it considers a change, the Contractor shall immediately notify the Owners Project Manager prior to disturbing the condition and shall then prepare and submit an original of the COR with all supporting documentation to the Owners project manager and two (2) copies of a Change Order Request with all required supporting documentation to the architect within five (5) calendar days of encountering the condition. The condition shall not be disturbed until the Project Manager has inspected the condition.

D. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a Change Order Request (COR) to Owners project manager. The contractor shall prepare and submit one (1) original of the COR with all supporting documentation to the Owners project manager and submit two (2) copies of the COR with all supporting documentation to the owner.

   1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum.

   2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

   3. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.

   4. Include costs of labor and supervision directly attributable to the change.

   5. Include an updated Contractor's Construction Schedule that indicates the effect of the change.
change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float however the date of Substantial and Final Completion cannot be extended.

6. Comply with requirements in General Conditions Article 4.15 if the proposed change requires substitution of one product or system for product or system specified.


1.5 ALLOWANCES (IF APPLICABLE ON A GIVEN PROJECT)

A. Allowance Adjustment: To adjust allowance amounts, base each Allowance Request Proposal on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins. Only allowances included as part of the Bid Price will be considered for an Allowance Authorization. All other Proposals must be hard costed.

1. Include installation costs in purchase amount only where indicated as part of the allowance.
2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
3. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to allowances.
4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the Purchase Order amount or Contractor's handling, labor, installation, overhead, and profit. Submit claims within ten (10) business days of receipt of the Change Order or Construction Change Directive authorizing work to proceed. Owner will reject claims submitted later than ten (10) business days after such authorization.

1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
2. No change to 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.

C. Use the same procedure(s) followed for handling Change Order Requests (COR's) and Change Orders with Allowances (except use Allowance Forms rather than Change Order Forms).

1.6 CHANGE ORDER PROCEDURES

A. Upon the Owner's approval of a Change Order Request (COR), the Owner will direct the Architect to issue a Change Order for signatures of the Contractor and Owner on AIA Document G701.

1. The Change Order breakdown shall be in sufficient detail to permit an analysis of all material, labor, equipment, sub-contract and overhead costs as well as profit. Any amount proposed for sub-contracts shall be supported by a similar price breakdown.

B. Each Change Order must contain a detailed description of the change and the amount by which the Contract Price will be increased or decreased.

C. COMPUTATION OF ADDITIONAL COMPENSATION
1. In connection with any request for additional compensation the Contractor shall furnish a price breakdown, as follows:

   a. Labor shall be broken down by the man-hour, hourly wages, fringe benefits per hour and any other benefits payable by the Contractor;
   b. Materials shall be broken down by quantity and unit prices.

2. Unless otherwise directed, the breakdown shall cover all work involved in the change whether such work was deleted, added or changed.

3. The breakdown shall be in sufficient detail to permit an analysis of all material, labor, equipment, sub-contract and overhead costs as well as profit. Any amount proposed for sub-contracts shall be supported by a similar price breakdown.

4. The following rates shall apply in computing indirect costs and profit for the negotiation of additional compensation under all provisions of this contract, which provide for such adjustments that do not exceed twenty-five thousand dollars ($25,000.00). The resulting change in the contract amount will include the indirect impact cost of extended performance computed in accordance with the terms of this article and no further consideration of such costs arising from the specific modification will be given. The percentages for overhead and profit shall be negotiated and may vary according to the nature, extent and complexity of the work involved. If not negotiated prior to the start of construction then the rates herein designated shall apply. The percentages shall be applicable for deleted work as well as additional work. When a change consists of both added and deleted work, the applicable percentages shall be applied to the net cost or credit. In any event, the percentages shall not exceed the sum of the following:

   a. Overhead will be the sum of ten percent (10%) of direct labor costs.
      1) For the purpose of the article, the term direct labor shall include all labor by contractor’s employees necessary to perform the actual work on site. Foremen, equipment operators and skilled, semi-skilled and common laborers directly assigned to the specific operation are direct labor; project managers, superintendents, office personnel, and subcontractors are not direct labor.
      2) The term direct labor costs shall consist of the contract or actual payroll rate of wage per hour and fringe benefits paid for each and every hour that such employees are actually engaged in the performance of the work. Overhead will be the sum of ten percent (10)% of direct material costs.
   b. Overhead will be the sum of ten percent (10%) of direct material costs.
      1) For the purpose of the article, the term direct material costs shall consist of the actual costs of the materials, including applicable tax and transportation charges
   c. For rented equipment, an hourly rental rate will be used which will be determined by using the monthly rental rates taken from the current edition of the rental rate blue book for construction equipment and dividing it by one hundred seventy-six (176). An allowance will be made for operating costs for each and every hour the equipment is actually operating in accordance with the rate listed in the aforesaid rental book. The contractor will be allowed only sixty-five percent (65%) of the rental rate on contractor owned equipment.
   d. Bond premiums, insurance, payroll taxes and travel subsistence, if applicable, will be allowed at actual cost (only) for the equitable adjustment allowed. No mark-up will be allowed for overhead on these indirect cost items.
   e. The contractor's profit on the sub-contractor's work will be five percent (5%) of the sub-contractor's costs. Sub-contractor indirect costs will be computed in the same manner as for the contractor. The contractor agrees to incorporate this article in each of it sub-contracts.
   f. A profit of six percent (6%) where profit is allowable by the terms of the applicable contract provision shall be added to the contractor's total cost for the equitable adjustment allowed for the work conducted by the contractors own workforce. Indirect costs will not be duplicated in direct costs.
   g. When more than one (1) tier of sub-contractors exists, they shall be treated as one
D. ANY CONTRACTOR PERFORMING CHANGE ORDER WORK WITHOUT WRITTEN APPROVAL FROM THE OWNER DOES SO AT ITS OWN RISK.

1. Only the signature of an Assistant Vice President or above is authorized to give approval of a Change Order Request (COR) or Change Order (CO). The Owners project manager is not authorized to approve change orders. The project manager is only authorized to verify the work in question is in addition to or outside the scope of work delineated on the original contract documents.

1.7 CONSTRUCTION CHANGE DIRECTIVE


1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost adjustments to the Contract.

END OF SECTION 012500
SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Sections include the following:

1. Division 1 Section "Allowances" for procedural requirements governing handling and processing of allowances.

2. Division 1 Section "Unit Prices" for administrative requirements governing use of unit prices.

3. Division 1 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.

4. Division 1 Section "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule and Submittals Schedule.

1.3 DEFINITIONS

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

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.

1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
   a. Application for Payment forms with Continuation Sheets.
   b. Submittals Schedule.

2. Submit the Schedule of Values submission to Architect and Owners Construction Manager in accordance with the general conditions and general conduct of work.

3. Sub schedules: Where the Work is separated into phases requiring separately phased payments, provide sub schedules showing values correlated with each phase of payment.

B. Format and Content: Use the Project Manual table of contents as a guide to establish line
items for the Schedule of Values. Provide at least one line item for each Specification Section.

1. **Identification:** Include the following Project identification on the Schedule of Values:
   a. Project name and location.
   b. Name of Architect.
   c. Architect's project number.
   d. Contractor's name and address.
   e. Date of submittal.

2. **Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:**
   a. Related Specification Section or Division.
   b. Description of the Work.
   c. Name of subcontractor.
   d. Name of manufacturer or fabricator.
   e. Name of supplier.
   f. Change Orders (numbers) that affect value.
   g. Dollar values
   h. Cost totals.
   1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

3. **Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.**
   a. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed.

4. **Round amounts to nearest whole dollar; total shall equal the Contract Sum.**

5. **Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.**
   a. Differentiate between items stored on-site and items stored off-site.
   b. The University may, in its sole discretion, pay the Contractor for material delivered on the site and preparatory work done to be taken into consideration. Material delivered to the contractor at locations other than the site may also be taken into consideration if (1) such consideration is specifically authorized by the contract and (2) the contractor furnishes a form entitled "Contractor's Summary of Stored Materials" and agreement and bill of sale certification, respectively, for stored materials and (3) the contractor furnishes evidence of insurance for said materials or a bonded warehousing agreement.

6. **Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.**

7. **Allowances:** Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities. Allowances will only be accepted for items listed in the Bid Documents.

8. **Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.**
   a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place must be shown as separate line items in the Schedule of Values.

9. **Schedule Updating:** Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.
   a. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.
1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
2. Submit three (3) copies of each Application for Payment, at least five (5) business days prior to the actual submission date as specified. This Application will be reviewed and adjusted by all parties (Architect, Owner and Contractor) at a **“PENCIL COPY REVIEW”** meeting prior to final approval.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.

C. Payment Application Times: The date for each progress payment is per the General Conditions. The period covered by each Application for Payment starts on the day following the end of the preceding period and ends 15 days before the date for each progress payment.

D. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets

E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Project Manager will return incomplete applications without action.

1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

F. Transmittal: Submit 3 (three) signed and notarized original copies of each Application for Payment to Project Manager by a method ensuring receipt within 24 hours. All copy’s shall include ‘Attachment to G702- Certification for Payment”, Release of Liens Forms (included in the Contract Documents) entirely completed for the contractor, all subcontractors and anyone else whose payment is listed in the Schedule of Values for the application being requested, AIA G706 A-Contractors Affidavit…, Certified Payrolls and Monthly Work Force Reports, updated and current Construction Schedule, updated and current Submittal Log, and current Project Photograph’s.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

G. Release of Mechanic’s Lien: With each Application for Payment, submit partial or final releases of mechanic’s lien (as may apply) from every entity that is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

1. Submit partial waivers on each item for amount requested, before deduction for retainage, on each item.
2. When an application shows completion of an item, submit final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Submit final Application for Payment with or proceeded by final waivers from every entity involved with performance of the Work covered by the application that is lawfully entitled to a lien.
5. Release Forms: Submit release of lien on forms, executed in a manner acceptable to Owner. (Use Form listed in Division 0 of the Specifications).

H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of Values.
3. Contractor's Construction Schedule (preliminary if not final).
   a) A final schedule must be submitted prior to Owners payment of the second (2nd) progress payment.
4. Products list.
5. Schedule of unit prices.
7. List of Contractor's staff assignments.
8. List of Contractor's principal consultants.
11. Initial progress report.
13. Certificates of insurance and insurance policies.
15. Data needed to acquire Owner's insurance.
16. Initial settlement survey and damage report if required.
17. Current construction photographs as specified herein.

I. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

J. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.

K. When Owner or Architect/Engineer requires substantiating information, submit data justifying
dollar amounts in question. Provide one (1) copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1. Any other information or documentation required by other provisions of the contract documents shall be supplied.

L. In order to be proper an Application for Payment must include the following as applicable:

1. Total amount, payee name and address, department/agency, payee declaration, payee reference number and identification number.
2. contract number, contractor’s name, period of the Application, completion date, number of sheets, amount due this period, amount to date, retainage, certification by payee, certification signed by the Project Manager and Architect and approval of payment signed by the contracting officer or his/her designee, previous payment requests, total deductions and additions.
3. In making progress payments for work, the University will retain two percent (2%) of the approved invoice of payment until final acceptance and completion of all work covered by the contract.
4. After fifty percent (50%) of the work has been completed, upon written request by the contractor and provided the contracting officer determines that the contractor’s performance and progress have been satisfactory, the University will make partial payments thereafter in full of the approved payment amount. If, however, progress is not maintained in accordance with the approved schedule, the contracting officer may elect to reinstitute retainage of two percent (2%) of amounts due to the contractor. The contracting officer shall have the sole authority to determine whether contractor’s performance and progress warrant waiver of two percent (2%) retainage.

M. Upon acceptance and completion of each building or other clearly definable severable portion of the contract work for which the price is stated separately within the contract, payment may be made in full at the discretion of the contracting officer including retained percentages thereon less authorized deductions.

N. All authorized Applications are to be sent to the Owners authorized representative at the address provided at the pre-construction conference. Receipt shall start the prompt payment clock unless returned to the contractor for correction within thirty (30) calendar days after receipt. Reference section 10.2.4 (d) of the General Conditions.

1.6 FINAL PAYMENT

A. Upon final acceptance, the amount due the contractor under this contract shall be paid upon satisfactory completion by the contractor of all contract close-out requirements as required by the University, completion of a University audit on all contract values and payments and after the contractor shall have furnished the University with a final release of liens from the contractor and all subcontractors, sub-subcontractors, vendors, suppliers and any other entity affiliated with the contractor for completion of this project of any and all claims against the University arising by virtue of this contract other than claims in stated amounts as may be specifically excepted by the contractor from the release.

B. Upon satisfying the above conditions, the contractor shall submit a properly executed Application for Final Payment to the University through the Project Manager. The University Controller shall date stamp the Application. This action by the University Controller shall constitute receipt of a properly executed State invoice application.

C. If, for any reason, the contractor refuses final payment, the project shall be closed-out by the University unilaterally processing a final acceptance certificate. The University will hold all residual funds in escrow until all claims of the University and all contractors are satisfied.
SECTION 013100 - COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, general conduct of the Work and Special Requirements, Supplementary Conditions, and other Division 1 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1.2 SUMMARY

A. This Section includes administrative and supervisory requirements necessary for coordinating construction operations including, but not necessarily limited to, the following:

1. General project coordination procedures.
2. Conservation.
3. Coordination Drawings.
4. Administrative and supervisory personnel.
5. Cleaning and protection.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 1 Section "Field Engineering" specifies procedures for field engineering services, including establishment of benchmarks and control points.
2. Division 1 Section "Submittals" for preparing and submitting the Contractor's Construction Schedule.
3. Division 1 Section "Contract Closeout" for coordinating contract closeout.

1.3 COORDINATION

A. Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in the sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
3. Make provisions to accommodate items scheduled for later installation.

B. The mechanical, electrical and fire protection drawings are diagrammatic only and are not intended to show the alignment, physical locations or configurations of such work. Such work shall be coordinated by the Contractor and shall be installed to clear all obstructions, permit proper clearances for the work of other trades, satisfy all code requirements and present an orderly appearance where exposed at no additional cost to the Owner.

C. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and
attendance at meetings.

1. Prepare similar memoranda for the Owner and separate contractors where coordination of their work is required.

D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Prepare and coordinate scheduling, delivery and processing of submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
2. Verify that utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
3. Coordinate space requirements, supports, and installation of mechanical and electrical work, which are indicated diagrammatically on the Drawings. Follow routing shown for pipes, ducts and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance and for repairs.
5. Progress meetings.
6. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
7. Coordinate completion and clean-up of work of separate sections.
8. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner’s activities.
9. Project closeout activities.

E. Conservation: Coordinate construction operations to assure that operations are carried out with consideration given to conservation of energy, water, and materials.

1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work.

1.4 SUBMITTALS

A. Coordination Drawings: Prepare coordination drawings where careful coordination is needed for installation of products and materials fabricated by separate entities. Prepare coordination drawings where limited space availability necessitates maximum utilization of space for efficient installation of different components.

1. Show the relationship of components shown on separate Shop Drawings.
2. Indicate required installation sequences.
3. Comply with requirements contained in Section “Submittals.”
   a. Note the coordination drawing submittal requirements under Section 013300 “Submittals”, paragraph 2.3.9

B. Staff Names: Within fifteen (15) days of commencement of construction operations, submit a list of the Contractor's principal staff assignments, including the superintendent and other personnel in attendance at the Project Site. Identify individuals and their duties and responsibilities. List their addresses and telephone numbers.

1. Post copies of the list in the Project meeting room, and the temporary field office.
PART 2 - EXECUTION

2.1 GENERAL COORDINATION PROVISIONS

A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

B. Coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.

2.2 CLEANING AND PROTECTION

A. Clean and protect construction in progress and adjoining materials in place, during handling and installation. Apply protective covering where required to assure protection from damage or deterioration at Substantial Completion.

B. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to assure operability without damaging effects.

C. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

END OF SECTION 013100
SECTION 013200 – CONSTRUCTION PROGRESS SCHEDULE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions (Contract Administration Division Section D), General Conduct of the Work and Special Requirements, and other Division 1 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1.2 SUBMITTALS

A. Within three (3) days after the date established in the Notice to Proceed, University Contract and/or purchase order submit preliminary schedule indicating the scope of work for the duration of the project. A Gantt chart format will be acceptable however the final approved schedule must be in both a Gantt chart and CPM schedule format. If another method other than CPM is used the critical path and float time must be established and programmed into the schedule.

B. Initial Working CPM Schedule Submittal: To the extent necessary for the Contractor to reflect in the arrow diagram the plan for completion of this contract, the contractor shall meet with and furnish all necessary information for the preparation of the scheduling system within ten (10) calendar days after award of this contract. This information shall include, but not necessarily be limited to, logical sequencing of work operations; activity time estimated, intended crew flow, activity costs and estimated manpower requirements of each activity.

1. The contractor shall be responsible to reflect all sub-contractor work as well as his/her own work in proper coordinated sequence on the network diagram. The contractor shall be prepared to meet as many times as necessary with the Project Manager for the timely development of the project schedule.

1.3 SCHEDULE FORMAT

A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number. At a minimum provide the following.

1. Include a separate bar for each portion of work or operation.
2. Identify the first workday of each week.
3. Identify each critical path task or portion of work.
4. Identify task durations, predecessors and dependent tasks.
5. Identify milestone dates for completion/start of each critical path element.

B. The contractor shall utilize the earliest scheduled start and finish dates in planning, coordinating and performing the work under this contract including all activities of subcontractors, equipment vendors and suppliers.

PART 2 - PRODUCTS – NOT USED
PART 3 - EXECUTION

3.1 CONTENT

A. Construction logic and activity time durations shall be established by the contractor subject to approval by the Owner’s Project Manager consistent with contract requirements and reflective of proper coordination between trades.

B. The Owner’s Project Manager shall establish the specific level of detail to be reflected in the scheduling system.

C. Seasonal weather conditions shall be considered in the planning and scheduling of all work influenced by high or low ambient temperatures for the completion of all contract work within the allotted contract time. In addition, appropriate allowances shall be made for anticipated time losses due to normal rain and snow conditions by statistically expanding the estimated time durations for weather sensitive activities with the constraint that the substantial completion deadline cannot change.

D. The coordinated combined Progress Schedule the Contractor will develop shall incorporate the schedules of all Prime Contractors engaged on the project. The Schedule shall be in a form as specified herein and elsewhere in the contract documents and in sufficient detail to satisfy the Architect/Engineer and the University.

E. If applicable, the Contractor shall submit copies of his initial draft of this Schedule to all Prime Contractors. Each Prime Contractor shall then prepare a Progress Schedule for his own work, properly coordinated with the General Construction Contractor’s initial draft and then submit it to the General Construction Contractor for his preparation of the final draft of a Single Coordinated Progress Schedule. Contract Requisitions will not be processed by the University until and unless such a single coordinated Progress Schedule shall have been submitted to and approved by the University Project Manager and/or Contracting Officer. This submission shall be no later than thirty (30) colander days after the award of the Contract. If any Prime Contractor delays his submission, the Project Schedule will be submitted without his input and any payments otherwise due him will be withheld until he complies.

F. The Progress Schedule based upon the Contractor’s logic and time estimates shall indicate, in suitable detail for display, all significant features of the Work of each Contractor, including the placing of orders and anticipated delivery dates for critical items and all other critical path activities, submissions and approvals of Shop Drawings, all work activities to be performed by each Contractor and the beginning and time durations thereof, float time and the dates of substantial and final completion of the various branches of the Work.

1. Show complete sequence of construction activity, with dates for beginning and completion of each element of construction.
2. Identify each item by specification section number or per bid form breakdown.
3. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
4. Indicate delivery dates as milestones for Owner-furnished items and any critical path items.
5. Provide legend for symbols and abbreviations used.
6. Show critical path tasks; differentiate them from other construction tasks.
7. Schedule will be based upon a five-day workweek.
3.2 REVIEW AND EVALUATION OF SCHEDULE

A. Review and Approval of Initial Working Schedule: Within ten (10) calendar days after receipt of the initial arrow diagram and computer produced schedule, the University's representative shall meet with the contractor and for joint review, correction or adjustment of the proposed plan and schedule to evaluate the cost values assigned to each activity. Within ten (10) calendar days after the joint review, the Contractor will revise the arrow diagram and the computer-produced schedule in accordance with agreement reached during the joint review and shall submit two (2) copies each of the revised arrow diagram, computer produced schedule and cost requisition to the University. The resubmission will be reviewed by the University and, if found to be as previously agreed upon, will be approved. An approved copy of each will be returned to the Contractor. The contractor shall review the schedule to insure that it reflects all changes agreed to and, if all changes have been made, the contractor shall approve and sign the network diagrams, computer produced schedule and cost requisition listing at that time. Approval will be without reservation and the contractor will be deemed to have accepted the schedule as adequate, proper and binding in all respects and shall not raise objections to the schedule. After the network diagrams, computer-produced schedule and cost requisition listing have been signed, the Contractor shall forward one (1) set of signed copies of all scheduling documents to the University Project Manager. The arrow diagram and the computer-produced schedule with approved signatures shall constitute the project work schedule until subsequently revised in accordance with the requirements of this section.

B. Evaluate project status to determine work behind schedule and work ahead of schedule. Submit revised recovery schedule with action plan to bring "behind schedule" tasks and milestones back into original timeline.

3.3 UPDATING SCHEDULES

A. Maintain schedules to record actual start and finish dates of completed activities.

1. Updated schedules must be submitted at each progress meeting and with each application for payment or as required by Architect or Owner. These schedules must include the following:
   a. approved changes in activity sequencing;
   b. changes in activity durations for unstarted or partially completed activities where agreed upon;
   c. the effect to the network of any delays in any activities in progress and/or the impact of known delays, which are expected to affect future work;
   d. the effect of contractor modifications; i.e., activity durations, logic and cost estimates; to the network;
   e. changes to activity logic where agreed upon to reflect revision in the contractor's work plan; i.e., changes in activity duration, cost estimates and activity sequences for the purpose of regaining lost time or improving progress;
   f. changes to milestones, and due dates (except substantial completion) which have been agreed upon by the University since the last revision of the schedule.

B. At the same time the network is updated, the contractor and the University’s representative shall jointly make entries on the preceding network diagram schedule to show actual progress, to identify those activities started by date and those completed by date during the previous period to show the estimated time required to complete each activity started but not yet completed, to show activity percent completed and to reflect any changes in the arrow diagram approved in accordance with the preceding paragraph. After completion of the joint review and the University's approval of all entries, the Contractor will submit updated network diagrams and an updated computer produced calendar dated schedule to the University and the
contractor.

1. The resultant computer print-out and network diagrams shall be recognized by the contractor as solely his/her updated construction schedule to complete all remaining contractor work except that portion affected by interim University decisions.

3.4 DISTRIBUTION OF SCHEDULES

A. Upon approval at each level of schedule development (preliminary, final for Contractors work and Single Coordinated including all Prime Contractors work) the Contractor shall prepare and distribute (10) copies of the schedule at each level to the University. The Contractor shall also prepare and distribute two (2) copies of the final schedule showing Prime Contractors work to each Prime Contractor. In the event a new Prime Contractor is added to the job the General Construction Contractor shall furnish a revised schedule immediately with copies as indicated. The final coordinated schedule shall be signed and dated by all Prime Contractors involved and shall become part of the contract documents.

B. Distribute copies of updated (current) schedules to Contractors project site file, subcontractors, suppliers, Architect and Owner at each bi-weekly progress meeting. Also submit an updated (current) schedule with each Application for Payment or more often as required by the Architect and/or Owner.

3.5 SCHEDULE ADJUSTMENTS

A. Upon Owner and/or Architects request, if Contractor falls behind the approved schedule, the Contractor must submit a revised schedule to show how the Contractor intends to accomplish the completion of the work within the original contract time.

1. Within seven (7) days after receipt of notice from the Owner, the contractor shall submit to the University in writing an explanation of corrective action taken or proposed. The contracting officer shall make a decision binding on all parties after reviewing the written submissions.

B. Responsibility for Completion: The contractor agrees that whenever it becomes apparent from the current monthly computer produced calendar dated schedule that any contract completion date will not be met, he/she will take some or all of the following actions at no additional cost to the University.

1. increase construction manpower in such trades and numbers as will substantially eliminate the backlog of work in the opinion of the Construction Manager and contracting officer
2. increase the number of working hours per shift, shifts per working days, working days per week or the amount of construction equipment of any combination of the foregoing sufficiently to substantially eliminate the backlog of work in the judgment of the Construction Manager and contracting officer
3. reschedule activities to achieve maximum practical concurrence of accomplishment of activities

C. Lost time due to weather conditions will not accrue nor be credited to Contractor for weather delays with time added to the Substantial Completion milestone deadline. No weather delays will be granted once the building is under roof.

3.6 BI-WEEKLY REPORTING
A. Upon request from the Owner, the Contractor shall furnish for approval, his proposed operating schedule for the next immediate two-week period of time. This schedule will be submitted at each bi-weekly progress meeting along with the overall updated schedule.

1. Every two (2) weeks, the Architect will conduct a coordination and scheduling meeting on the job site. At this meeting, the contractor shall provide detailed information in the form of a bar chart schedule regarding the work schedule to be performed during the upcoming two (2) weeks. Bi-weekly scheduling by the contractor shall be in accordance with the priorities and degree of concurrent work required by the official schedule for the project. The contractor shall be prepared to explain a difference between the contractor's bi-weekly schedules and the priorities required by the latest updating of the official schedule.

2. At the bi-weekly scheduling meeting, the Owner and Architect shall review the bar charts for the preceding two (2) weeks and the contractor shall report the progress actually achieved for each activity, which was scheduled to be performed during the two (2) weeks, including the actual dates on which the work was performed. The contractor agrees that this information shall constitute the official historical record of project progress. At each bi-weekly scheduling meeting, the contractor shall document any current delays to work operations. In addition, the contractor shall provide any available information regarding any potential delays, which they anticipate; i.e., procurement delays, expected strikes, etc.

3. Following the bi-weekly scheduling meeting, the Contractor shall issue to the Owner and Architect a new set of bi-weekly bar charts as developed at the meeting, which shall constitute the construction schedule for the upcoming two (2) weeks. The Contractor shall also issue a narrative bi-weekly progress analysis documenting progress achieved during the preceding two (2) weeks and analyze delays reported to constitute current or anticipated impacts to timely construction. The revised bar chart schedule and progress narrative shall agree with the meeting minutes and items discussed and agreed to at the bi-weekly meeting.

4. The contractor shall be represented at the bi-weekly scheduling meeting by their Construction Manager who shall have complete authority to provide the information required for the development of the next two (2) weeks bar chart schedule, documentation of past progress and documentation of delays. The contractor representatives shall also be authorized to discuss correction action planned to overcome delaying conditions at these meetings.

3.7 DAILY REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at the Project site:

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

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

END OF SECTION 013200
SECTION 013300 SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, General Conduct of the Work, Supplementary Conditions, and other Division 1 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

B. EVERY EFFORT MUST BE MADE TO ACCELERATE LONG LEAD SUBMITTALS ON ALL LONG LEAD MATERIALS TO ASSURE MEETING THE PROJECT SCHEDULE.

1.2 SUMMARY

A. This Section augments requirements set forth in the General Conditions and specifies administrative and procedural requirements for submittals required for performance of the Work, including:

1. Contractor’s Use of Architect’s CAD Files.
2. Shop Drawings.
3. Product Data.
4. Samples.
5. Informational Submittals.
6. Delegated Design.

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

1. Permits.
2. Contractor’s Construction Schedule.
4. Schedule of Values.
5. Applications for payment.

C. Related Sections include the following:

1. Division 1 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes and for submitting Coordination Drawings.
2. Division 1 Section "Quality Requirements" for submitting test and inspection reports and for mockup requirements.
3. Division 1 Section "Closeout Procedures" for submitting warranties.
4. Division 1 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
5. Division 1 Section "Demonstration and Training" for submitting videotapes of demonstration of equipment and training of Owner's personnel.
6. Divisions 2 through 16 Sections for specific requirements for submittals in those
1.3 DEFINITIONS

A. Action Submittals: Written and graphic information that requires Architect and Construction Manager's responsive action.

B. Informational Submittals: Written information that does not require Architect and Construction Manager's responsive action. Submittals may be rejected for not complying with requirements.

C. Concurrent Review: Simultaneous review by Architect and other discipline(s).

D. Shop Drawings: Original fabrication drawings.

E. Product Data: Manufacturer's standard product literature and samples.

1.4 SUBMITTAL PROCEDURES

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
   a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

B. Submittals Schedule: Comply with General Conditions and other requirements of the Contract Administration Division. A submittal schedule will be developed by the Contractor within 10 working days of Notice to Proceed and approved by the Architect within 10 working days after receipt for review.

1. Follow the submittal requirements listed in this Section and elsewhere throughout the Contract Documents however and in addition to submittals required in other specification sections, one (1) copy of all HVAC, sprinkler, plumbing, electrical, and control system submittal must be forwarded to the Owners Project Manager. At minimum, for submittals other than those listed under this item a transmittal must be forwarded to the Project Manager.

C. Contractor shall record all submittal information on the required “Submittal Log”. Distribute Log at each progress meeting.

D. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 10 working days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.

2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 5 working days for review of each resubmittal.

4. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect’s consultants, allow 10 working days for initial review of each submittal. Submittal will be returned to Contractor, through Architect. Submittals in the following sections require concurrent consultant review:
   a. Division 3: All Sections.
   b. Division 5: Sections 05120 “Structural Steel”, 05310 “Steel Deck”, 05300 “Steel Joists.
   c. Division 9: Acoustic Sections
   d. Division 13: All Sections.
   e. Division 15: All Sections.
   f. Division 16: All Sections.

5. Concurrent Transmittal to Consultant: Where indicated above and acceptable to Architect, Contractor may transmit submittals directly to Architect’s consultants in the required number of copies, while at the same time transmitting two additional copies of the entire submittal including the transmittal to the Architect.

6. Concurrent Transmittal to Owner:
   a. Transmit two (2) additional copies of all shop drawings, product data and coordination drawings and coordination drawings and one (1) set of each sample submittal to Owner’s Project Manager.

E. Identification: Place a permanent label or title block on each submittal for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 4 by 5 inches on label or beside title block to record Contractor’s review and approval markings and action taken by Architect.
3. Include the following information on label for processing and recording action taken:
   a. Project name.
   b. Date.
   c. Name and address of Architect.
   d. Name and address of Contractor.
   e. Name and address of subcontractor.
   f. Name and address of supplier.
   g. Name of manufacturer.
   h. Submittal number or other unique identifier, including revision identifier.
      1) Architect will assign own numbers to each submittal, which may be different than those assigned by the Contractor.
   i. Number and title of appropriate Specification Section, and Keynote reference where applicable.
   j. Drawing number and detail references, as appropriate.
   k. Other necessary identification.

F. Deviations: Encircle or otherwise specifically identify deviations from the Contract Documents on submittals.

G. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.

1. Submit specified number of copies of submittal to concurrent reviewer in addition to one complete copy and transmittal to Architect.
2. Additional copies submitted for maintenance manuals will not be marked with action taken and will be returned.
H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review, received from sources other than Contractor.

1. Transmittal Form: Provide locations on form for the following information:
   a. Project name.
   b. Date.
   c. Destination (To:).
   d. Source (From:).
   e. Names of subcontractor, manufacturer, and supplier.
   f. Category and type of submittal.
   g. Submittal purpose and description.
   h. Specification Section number and title.
   i. Drawing number and detail references, as appropriate.
   j. Submittal and transmittal distribution record.
   k. Remarks.
   l. Signature of transmitter.

2. On the transmittal record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations. Include Contractor's Certification that information complies with Contract Document requirements.

I. Contractor's Certification: All scale and full-size shop, erection or setting drawings, roughing drawings, sleeve and opening drawings, product data, and samples shall be examined and checked by qualified technical employees of Contractor as to accuracy, completeness and compliance with all contract documents prior to submission to the Architect for his review. These drawings, data and samples shall be stamped and signed by Contractor certifying to such examination and compliance. Any drawings, data and samples not checked, stamped, and signed by Contractor will be returned unchecked, to Contractor. Contractor will be held responsible for any delay in the progress of the work due to his failure to observe these requirements, and the time for the completion of his contract will not be extended on account of his failure to submit drawings, data and samples promptly in accordance herewith.

J. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked "No Exceptions Taken", or "Make Corrections Noted".

K. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, and authorities having jurisdiction, and others as necessary for performance of construction activities. Furnish one (1) copy of final submittals to Owner. Show distribution on transmittal forms.

L. Use for Construction: Use only final submittals with mark indicating "No Exceptions Taken" or "Make Corrections Noted" by Architect.

M. In instances where sepias, shop drawings and/or erection of drawings of a scale larger than the contract drawings are prepared by a contract, such drawings and sepias will be accepted in lieu of marked-up contract drawings provided they are updated according to the contract documents. A master sheet of the same dimensions as the contract drawings shall be prepared by the contractor on a tracing which shall indicate, sheet by sheet, a cross-reference.
to all shop drawings pertaining to that drawing. All drawings and sepia as required by Section 2.8 F below, shall be labeled “as-built” and dated above the tile block.

1.5 CONTRACTOR’S USE OF ARCHITECT’S CAD FILES

A. General: Architect may provide electronic copies of CAD files of the Contract Drawings for Contractor’s use in preparing submittals subject to execution by the Contractor of a waiver and payment to the Architect for this service in the amount of $250. In accordance with the language of the waiver, the agreement is non-transferable by the Contractor to any Subcontractor, from any Subcontractor to the Contractor or from any Subcontractor to another Subcontractor. A separate waiver and payment is required for each individual contractor or subcontractor requesting electronic copies of CAD Drawings.

1. A sample copy of the waiver is included at the end of this Section. Upon request, Architect will provide an original.
2. This service is not available prior to the award of the contract.
3. Architect’s consultants may or may not provide CAD files under the above agreement. Such consultants reserve the right to refuse to provide CAD files, regardless of whether or not the aforementioned waiver and fee agreement is executed. Consultants may, if they agree to provide CAD files, attach additional conditions to those listed above and below. Architect’s consultants include the following disciplines: civil, landscape, structural, mechanical, electrical, plumbing, and fire protection. Architect will advise Contractor if any consultants will not provide CAD files prior to executing above agreement.
4. CAD files will be provided in AutoCad 2002 format or newer version only.
5. CAD files will be provided in Architect’s office standard conventions for file structure, file names, layering standards, drafting standards, etc. Architect will not make revisions to these standards for the convenience of the Contractor.
6. CAD files may or may not contain differences from the Contract Documents, including work and information related, but not limited to, alternate designs, obsolete designs, addenda, bulletins, construction sketches, and informational sketches. Such differences may or may not be clearly indicated. Where such differences are found, they do not supersede the Contract Documents.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Specification Sections.

B. When the following are specified in individual sections, submit them for review:

1. Shop drawings.
2. Samples for selection.
3. Samples for verification.
4. HVAC Test and Balance Reports.

C. 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.

D. Architect will consult with the Owner prior to rendering a decision or approval.

2.2 PRODUCT DATA
A. Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:
   a. Manufacturer’s written recommendations.
   b. Manufacturer’s product specifications.
   c. Manufacturer’s installation instructions.
   d. Standard color charts.
   e. Manufacturer’s catalog cuts.
   f. Wiring diagrams showing factory-installed wiring.
   g. Printed performance curves.
   h. Operational range diagrams.
   i. Mill reports.
   j. Standard product operation and maintenance manuals.
   k. Compliance with specified referenced standards.
   l. Testing by recognized testing agency.
   m. Application of testing agency labels and seals.
   n. Notation of coordination requirements.
4. Submit Product Data before or concurrent with Samples. Each item of materials listed shall be marked “as specified” or “unspecified” as the case may be.
5. Number of Copies: Submit one original and three copies. For color charts submit four original color charts. One original and one copy will be returned. Reproduction for distribution to subcontractors, manufacturers, fabricators and suppliers is the responsibility of the Contractor.
   a. Concurrent Submittals to Consultants: Submit one original and three copies to concurrent reviewer and two copies to Architect. In the case of color charts and other non-reproducible information, submit four originals to concurrent reviewer and two original to Architect.
   b. Concurrent Submittals to Owner: Submit one (1) copy.
   c. Copy Owner with any transmittals for Product data sent to Architect or Consultants.

2.3 SHOP DRAWINGS:

A. Shop Drawings:

1. Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
2. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
   a. Dimensions.
   b. Identification of products.
   c. Fabrication and installation drawings.
   d. Roughing-in and setting diagrams.
   e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
   f. Shopwork manufacturing instructions.
   g. Templates and patterns.
   h. Schedules.
   i. Design calculations.
   j. Compliance with specified standards.
   k. Notation of coordination requirements.
l. Notation of dimensions established by field measurement.
m. Relationship to adjoining construction clearly indicated.
n. Seal and signature of professional engineer if specified.
o. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.

3. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 36 by 48 inches.

4. Number of Copies: Submit one original (Contractor’s option of bond print or correctable translucent reproducible print) and three additional copies. One original and one copy will be returned. Reproduction for distribution to subcontractors, manufacturers, fabricators and suppliers is the responsibility of the Contractor.
   a. Concurrent Submittals: Submit one original and three copies to concurrent reviewer and two copies to Architect.
   b. Concurrent Submittals to Owner: Submit one (1) copy to Owner
   c. Copy Owner with any transmittals for Product data sent to Architect or Consultants.

5. Special Types of Shop Drawings:
   a. Sleeve and Opening Drawings: Comply with requirements set forth in the General Conditions.
      1) Comply with shop drawing requirements for submittal and review as specified in this Section.
   b. Roughing Drawings: Furnish manufacturers certified roughing drawings, indicating accurate locations and sizes of all service utility connections, for machinery and equipment requiring such connections. Submit roughing drawings together with shop drawings for respective machinery and equipment.

6. Mechanical/Electrical Shop Drawing Minimum Requirements: Shop Drawings prepared by mechanical specialty trades shall comply with the following minimum requirements:
   a. The accurate dimensions locate all horizontal ducts from column centerline. Locate all offsets, transitions, elbows, fire dampers, registers, grilles and diffusers.
   b. All components shall be located to avoid recessed lighting, piping, conduits, cable trays and other in-plenum assemblies and where required shall be located so as to provide access to the component through removable ceiling material panels or access doors.
   c. Vertical riser ducts shall be located and dimensioned from column centerlines in two (2) directions. Each vertical duct riser shall be shown in its total length when concealed inside of a shaft.
   d. Each horizontal duct run shall be drawn to scale and size (width and depth noted) and an ELEVATION (bottom of duct) be clearly noted. This elevation shall clear all beams in the floor above and the ceiling construction below.
   e. Sheet metal shop drawings shall be made using not less than ¼” scale per foot; increase scale as required in congested areas or as directed by the Contractor.

7. All piping, including fire protection, storm, sanitary, domestic, heating and cooling systems.
   a. Give location of lines from column centerlines, indicate size, indicate centerline ELEVATION of piping and indicate drainage pitch as required.
   b. Where a piping line is indicated locate centerline ELEVATION and pitch at intervals not to exceed twenty (20) feet.
   c. Priority status shall be accorded preparation of dimensioned piping drawings for all piping below slabs-on-grade. Show all line pitches, critical inverts, in-slab fixtures as drains, floor sinks, troughs, cleanouts, etc. and outfall tie-in to site plumbing. Coordinate under slab piping with arrangement(s) of equipment furnished by others where applicable.

8. Electrical Trade:
   a. Plan layouts, not less than ¼” scale, of transformer vaults, main electrical rooms, satellite electrical and/or communications closets, emergency generator spaces showing equipment to scale and locations thereof.
b. Main feeder distribution routing, horizontal and vertical sweep transitions to scale, of conduit over 1" showing ceiling plenum to scale.

9. Coordination:
   a. Coordination of the work of the several trades and the fitting and routing of the systems within concealed areas to avoid conflicts is the responsibility of the contractor(s). The Architect reserves the right to request coordinated drawings of congested areas showing all systems in plan and section to appropriate scale to insure the proper fitting of the work. The Contractor shall comply if so requested by the Architect.
   b. Provide coordinated drawings of all main mechanical, electrical, communications, and other rooms listed below showing equipment required by all trades including structure, piping, hanger assemblies, HVAC ductwork, conduit, electrical devices, fire alarm devices, control centers, pipe grids, acoustic enclosures, other devices. Drawings dimensioned in both plan and section(s); not less than 3/8”=1'-0" scale.

2.4 COORDINATION DRAWINGS

A. Prepare and submit Coordination Drawings where close and careful coordination is required for installation of products and materials fabricated off-site by separate entities, and where limited space availability necessitates maximum utilization of space for efficient installation of different components. See paragraph 2.3.9 above.

   1. Show the interrelationship of components shown on separate Shop Drawings.
   2. Indicate required installation sequences.
   3. Refer to Division-15 and Division-16 "General Provisions" Sections for specific Composite Drawing requirements for mechanical and electrical installations.

B. Role of Expediter: Contractor shall be responsible for expediting the preparation of the Coordination Drawings. Actual preparation of the drawings is described below. Contractor shall meet with subcontractors to develop a format for the Coordination Drawings (e.g. CAD, pin-register drafting, conventional drafting on Mylar using multiple pencil colors, etc.) such that reproductions obtained from the final Coordination Drawings can distinguish between the work of the various trades. Contractor shall resolve all conflicts arising in the coordination process.

C. Preparation Responsibility: Preparation of Coordination Drawings is the responsibility of the Contractor and all subcontractors principally involved. Production of the drawings shall proceed as follows:

   1. HVAC subcontractor shall initiate the drawings by indicating his work, drawn at a scale of 3/8" per foot, showing dimensions, layouts, elevations and sections, all in relation to building construction (all steel structure, floor / roof slabs, ceilings, beams and columns).
   2. Where applicable, the GWB subcontractor shall indicate the layout of all acoustic ceiling construction extent including all hanger devices and locations. AC ceiling construction indicated as well.
   3. Fire Protection subcontractor shall then indicate the layout, sizes, dimensions and elevations of his work, using the HVAC subcontractor's drawings as a base, with dimensions in reference to fixed building construction.
   4. Electrical subcontractor shall add his work to the base drawings begun by HVAC and Fire Protection subcontractors. Indicate locations and dimensions of light fixtures and electrical equipment conduit/cable-tray infrastructure, fire alarm equipment with reference to fixed building construction.
   5. Plumbing subcontractor shall then add layouts, sizes and elevations of his work to the drawings of the above-mentioned trades, also dimensioned with reference to building structure.
D. Conflicts arising between the work of several trades shall be resolved between the respective trades, with the assistance of the General Contractor as expeditor; and the drawings revised. Final Coordination Drawings shall be submitted by the Contractor to the Architect as required for submittals.

2.5 SAMPLES:

A. Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.

2. Identification: Attach label on unexposed side of Samples that includes the following:
   a. Generic description of Sample.
   b. Product name and name of manufacturer.
   c. Sample source.
   d. Number and title of appropriate Specification Section.

3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
   a. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
   a. Number of Samples: Submit three full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
   a. Number of Samples: Submit four sets of Samples. Architect will retain one Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a Project Record Sample.
      1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
      2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

2.6 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.

1. Number of Copies: Submit two copies of each submittal, unless otherwise indicated. Architect will not return copies.

2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. An officer shall sign certificates and
certifications or other individual authorized to sign documents on behalf of that entity.

3. Test and Inspection Reports: Comply with requirements specified in Division 1 Section "Quality Requirements."

B. Coordination Drawings: Comply with requirements specified in Division 1 Section "Coordination."

C. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names.

D. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.

E. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

F. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

G. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

H. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

I. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

J. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

K. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

1. Name of evaluation organization.
2. Date of evaluation.
3. Time period when report is in effect.
4. Product and manufacturers' names.
5. Description of product.
6. Test procedures and results.
7. Limitations of use.

L. Schedule of Tests and Inspections: Comply with requirements specified in Division 1 Section "Quality Requirements."
M. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

N. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

O. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

P. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 1 Section "Operation and Maintenance Data."

Q. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

R. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
   1. Preparation of substrates.
   2. Required substrate tolerances.
   3. Sequence of installation or erection.
   4. Required installation tolerances.
   5. Required adjustments.
   6. Recommendations for cleaning and protection.

S. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
   1. Name, address, and telephone number of factory-authorized service representative making report.
   2. Statement on condition of substrates and their acceptability for installation of product.
   3. Statement that products at Project site comply with requirements.
   4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
   5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
   6. Statement whether conditions, products, and installation will affect warranty.
   7. Other required items indicated in individual Specification Sections.

T. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.
2.7 DELEGATED DESIGN

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit three copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

2.8 ADMINISTRATIVE SUBMITTALS

A. Contractor’s Construction Schedule: Comply with the General Conditions and other requirements of the Contract Administration Division.

1. If preliminary schedule requires revision after review, submit revised schedule within 5 business days.
2. Submit updated schedule with each Application for Payment.

B. Submittals Schedule: Comply with the General Conditions and other requirements of the Contract Administration Division.

1. Submit updated Submittal Log with each Application for Payment.

C. Application for Payment: Comply with the General Conditions and other requirements of the Contract Administration Division.

D. Schedule of Values: Comply with the General Conditions and other requirements of the Contract Administration Division.

E. Subcontract List: Comply with the General Conditions and other requirements of the Contract Administration Division. Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.
4. Number of Copies: Submit three copies of subcontractor list, unless otherwise indicated. Architect will return two copies.
   a. Mark up and retain one returned copy as a Project Record Document.
5. Submit one (1) copy of initial subcontractor list to Owner within (10) business days after Owner’s Notice to Proceed. No portion of the work shall be started until the Contractor has furnished the Owner with a list showing the sub-contractor and/or material supplier responsible for the portion of the actual work needing to be started. The list will be
updated until the list reflects the complete group of all subcontractors, suppliers, vendors, etc. employed to carry out the work.

F. The contractor shall keep one (1) set of drawings on the project at all times which are to be marked "as-built". During the course of the project, they shall mark these drawings with colored pencils to reflect any changes as well as dimension, the location of all pipe runs, conduits, traps, footing depths or any other information not already shown on the drawings or differing there from. All buried utilities outside the building shall be located by a meter and bounds survey performed by a licensed surveyor who shall certify as to its accuracy. These marked-up drawings and surveys shall be made available to the contracting officer, the Construction Manager and the Architect/Engineer at any time during the progress of the work upon their request. These shall include the drawings of principal sub-contractors as well. The Owner’s Project Manager as well as the Architect on a monthly basis as a prerequisite to the review of the contractor's payment applications will review as-built drawings.

2.9 SUBMITTALS FOR PROJECT CLOSE OUT

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 (if and when required by the Owner).
5. Other types as indicated.

B. Manufacturers’ Instructions, Product Literature, Certificates, and Reports.

1. All instructions, literature, certificates, test reports, other technical data and correspondence shall be submitted in four (4) copies. The Owner shall retain Two (2) copies, and the other two (2) returned to the Contractor.

C. Written Certifications

1. Provide written certifications where required, in the following formats:
   a. Manufacturer’s Written Certifications: Shall be submitted in letter form on the manufacturer’s letterhead, signed by an authorized representative, indicating that all required components and elements of their manufacture are in conformity with the requirements so stated under the individual sections of these Specifications. Technical data, additional support material, or other information may be submitted with the certification letter.
   b. Installer’s Written Certifications: Shall be submitted in letter form on the installer’s company letterhead, signed by a legal authorized company officer, indicating that their respective installation and/or Work are in conformity with the requirements so stated under the individual sections of these Specifications.

D. Submit all of the above items in this Section for the Owner’s benefit during and after project completion.

PART 3 - EXECUTION

3.1 CONTRACTOR’S REVIEW

A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with
approval stamp before submitting to Architect. The Architect / Consultants will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT’S ACTION

A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:

1. **Final Unrestricted Release**: When submittals are marked "No Exceptions Taken" (NET), that part of the Work covered by the submittal may precede provided it complies with requirements of the Contract Documents; final acceptance will depend upon compliance.

2. **Final-But-Restricted Release**: When submittals are marked "Make Corrections Noted" (MCN), that part of the Work covered by the submittal may precede provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.

3. **Returned for Resubmittal**: When submittal is marked "Amend and Resubmit" (AR), 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 if necessary to obtain a different action mark.
   a. Do not permit submittals marked "Amend and Resubmit" to be used at the Project site, or elsewhere where Work is in progress.

4. **Disapproved for Non-Compliance**: When submittal is marked "Rejected - See Remarks" (R), Architect’s explanation for rejection will be included. Do not proceed with the work. Prepare a completely new submission.

5. **Other Action**: Where a submittal is primarily for information or record purposes, special processing or other activity, the submittal will be returned, marked "Action Not Required".

C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.

E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

F. Architect's Review: Review of shop and setting drawings, roughing drawings, sleeve and opening drawings, product data and samples by Architect will be a general review for conformance with design concept and compliance with information given in contract documents only, and shall not relieve Contractor of responsibility for accuracy of such submissions, nor for proper fitting, construction of work, or for furnishings of materials or work required by the contract and not indicated on submissions. Field dimensions, fabrication details, and job fitting are entirely Contractor's responsibility. Review shall not be construed as approving departures from contract requirements. Any proposed deviations from contract requirements, together with
Contractor's explanations thereof, shall be stated in the letter of transmittal. Approval of a specific item shall not indicate approval of an entire assembly of which the item is a component. Should contractor check and certify submissions which indicate changes or deviations from the contract documents, and such changes are found acceptable to Architect, any and all additional costs resulting therefrom, including any cost for changes required to adjacent work or the work of other trades shall be the sole responsibility of Contractor.

RELEASE AGREEMENT – DIGITAL INFORMATION – SAMPLE

Architects and sub-consultants have prepared design documents for the project identified as:

These design documents are instruments of the Architect's and sub-consultants' service and they retain all rights to such work. The design documents requested have been issued in hard copy form, which is the basis of a contract with the project Owner.

The undersigned has requested copies of these design documents in digital format.

Architect provides the digital files under the following understandings and conditions:

1. The digital files provided are not the contract documents. The digital files provided may differ from the contract documents and have not been verified against the actual (hard-copy) contract documents.
2. The digital files can deteriorate undetected or be altered without the knowledge of Architect. The use of the digital information is wholly at the risk of the undersigned.
3. Architect is under no obligation to provide any software, hardware, any supplemental files, linked data or operational support required to read and/or manipulate the digital files.
4. Architect is under no obligation to correct, modify, update or to notify the undersigned of the need to correct, modify or update the digital files.
5. The undersigned agrees to indemnify, release and hold Architect and their consultants and the Owner harmless from any responsibility or obligation as to the accuracy or completeness of the digital information and further waives any claim it may have for compensation for additional work, delay costs, losses, consequential damages, and expenses including but not limited to attorney fees resulting from the undersigned relying upon or utilizing the digital information.
6. The digital files are provided for the exclusive use of the undersigned personnel only. The information will not be transferable or transmitted by the undersigned for use by others.
7. The above shall constitute an agreement between Architect and the undersigned for providing a service.
8. This agreement does not constitute a waiver of copyright or transfer of ownership of the said information and documents.

This agreement accepted by: By:________________________________________

Witness:_________________________ Title:______________________________

Date:__________________________

Company:________________________________________________________

Address:________________________________________________________________

END OF SECTION 013300
SECTION 014000 - QUALITY CONTROL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, general conduct of the Work and Special Requirements, Supplementary Conditions, and other Division 1 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1. In Divisions 1 through 16 Sections:
   a. The term "Architect" shall be synonymous with the term "Professional".
   b. The terms “Subcontractor”, “Sub-subcontractor”, “Installer”, “Applicator”, “Erector” and similar terms are synonymous with the term “Trade Contractor”.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for quality-control services.

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

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

D. Requirements of this Section relate to fabrication and installation procedures.

1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.

2. Specified inspections, tests, and related actions do not limit Contractor’s quality-control procedures that facilitate compliance with Contract Document requirements.

3. Requirements for Contractor to provide quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

E. Related Sections: The following Sections contain requirements that relate to this Section:

1. Testing by the Contractor of installed materials and equipment is specified in the Technical Sections (Divisions 2 through 17) of these Specifications.

F. Testing requirements for real property installed equipment (RPIE) to be furnished by the contractor when such testing is required by code, contract or the manufacturer shall be performed in a pre-approved testing laboratory or in the absence of such by the manufacturer or its authorized representative at its place of business. The contractor shall provide a five (5) days' notice to the University and Architect/Engineer through the Project Manager. The University and the Architect/Engineer shall have the right to witness all tests.

G. The contractor will hire and pay for a qualified testing agency.
1.3 RESPONSIBILITIES

A. Contractor Responsibilities: Unless otherwise indicated as the responsibility of another identified entity, Contractor shall provide inspections, tests, and other quality-control services specified elsewhere in the Contract Documents and/or required by authorities having jurisdiction. Costs for these services are included in the Contract Sum.

1. Where individual Sections specifically indicate that certain inspections, tests, and other quality-control services are to be done these services will be the Contractor's responsibility. The Contractor shall employ and pay a qualified independent testing agency to perform quality-control services. Costs for these services are included in the Contract Sum.

B. Retesting: The Contractor is responsible for retesting where results of inspections, tests, or other quality-control services prove unsatisfactory and indicate noncompliance with Contract Document requirements, regardless of whether the original test was Contractor's responsibility.

1. The cost of retesting construction, revised or replaced by the Contractor, is the Contractor's responsibility where required tests performed on original construction indicated noncompliance with Contract Document requirements. The contractor shall pay for all costs including administrative cost incurred by the University.

2. When the University and/or Architect/Engineer require special or additional inspections, testing or approvals due to Contractor's failure to comply with contract specifications, industry standards, good building practices, any applicable code procedures including but not limited to ASIC, ASTM, etc., whether or not testing is required by the contract documents for any individual component, entire system or process, the Contractor will secure the service of such special or additional inspections, testing or approvals. In the event such special or additional inspections and testing reveal a failure of the work to comply with the terms and conditions of the contract, the contractor shall also bear all costs necessary to repair or replace the work as required by the Architect/Engineer.

C. Associated Services: Cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following:

1. Provide access to the Work.

2. Furnish incidental labor and facilities necessary to facilitate inspections and tests.

3. Take adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.

4. Provide facilities for storage and curing of test samples.

5. Deliver samples to testing laboratories.

6. Provide the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.

7. Provide security and protection of samples and test equipment at the Project Site.

D. Duties of the Testing Agency: The independent agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual Sections shall cooperate with the Architect, the Contractor and the Owner in performance of the agency's duties. The testing agency shall provide qualified personnel to perform required inspections and tests.

1. The agency shall notify the Architect, the Contractor, and the Owner promptly of
irregularities or deficiencies observed in the Work during performance of its services.

2. The agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.

3. The agency shall not perform any duties of the Contractor.

E. Coordination: Coordinate the sequence of activities to accommodate required services with a minimum of delay. Coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.

1. The Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.

1.4 SUBMITTALS

A. Submit a certified written report of each inspection, test, or similar service.

1. Distribute copies of each report to Owner, Architect and Engineer. Distribution of reports shall be made promptly, upon the completion of each test or inspection. A field report will be distributed to the Owner’s Project Manager prior to the Inspector leaving the jobsite on any day during which a test or inspection has been done. A final inspection report will be required from the inspection agency to all parties within five (5) business days following the inspection. Test reports will be required within (5) business days following the actual test date.

2. Submit additional copies of each written report directly to the governing authority, when the authority so directs.

3. Report Data: Refer to specification sections of Divisions 2 through 17 for submittal requirements applicable to inspection and test reports. In general, each report shall include:
   a. Date of issue.
   b. Project title 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 the inspection or test.
   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 an interpretation of test results.
   j. Ambient conditions at the time of sample taking and testing.
   k. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.
   l. Name and signature of laboratory inspector.
   m. Recommendations on retesting.

4. All submittals of inspections and test reports or requests for approval shall be accompanied by a certification signed by the contractor attesting to his/her knowledge of the submittal, acceptance of its findings and acknowledgement that material tested meets the required standards and certify the report’s representation of the facts. Failure to provide the written certification shall be grounds for rejection of the submittal.

1.5 QUALITY ASSURANCE

A. Qualifications for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, that are prequalified as complying with the American Council of Independent Laboratories’ “Recommended Requirements for Independent Laboratory Qualification” and that specialize in the types of inspections and tests to be performed.
1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the state where the Project is located.

2. Each independent inspection and testing agency engaged on the Project shall be pre-qualified by the Division of Building and Construction of the State of New Jersey to perform the types of tests and inspections required.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 REPAIRS AND PROTECTION

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

B. Protect construction exposed by or for quality control service activities, and protect repaired construction.

C. Repair and protection is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

END OF SECTION 014000
SECTION 014100 - TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including general conditions, general conduct of the work and special requirements, supplementary conditions, and other Division 1 specification sections, apply to this section. In the event of any conflicts between the requirements of these sections, the more stringent requirement shall apply.

1.2 SECTION INCLUDES

A. Selection and payment.
B. Contractor submittals.
C. Laboratory responsibilities.
D. Laboratory reports.
E. Limits on testing laboratory authority.
F. Contractor responsibilities.

1.3 RELATED SECTIONS

A. General Conditions: Inspections, testing, and approvals required by public authorities.
B. Individual Specification Sections: Inspections and tests required, and standards for testing.
C. Drawings and general provisions of the Contract, including General Conditions, General Conduct of the Work and Special Requirements, Supplementary Conditions, and other Division 1 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these sections, the more stringent requirement shall apply.

1.4 REFERENCE STANDARDS

B. ASTM C1077 - Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.
C. ASTM D290 - Recommended Practice for Bituminous Mixing Plant Inspection.
D. ASTM D3740 - Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.


1.5 SELECTION AND PAYMENT

A. Contractor shall employ and pay for services of an independent Testing Laboratory, and Balancing Laboratory/Organization, approved by Owner and Architect/Engineer, to perform all specified inspecting and testing.

B. Employment of testing laboratory in NO WAY relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

1.6 QUALITY ASSURANCE


B. Testing Laboratory Qualifications: Shall have been inspected by a nationally recognized inspection agency, acceptable to Owner and Architect/Engineer. Evidence of such inspection and current status shall be provided to Owner and Architect/Engineer. In addition, the approved lab shall document participation in a nationally recognized soils and concrete reference testing program during the twelve (12) months preceding the start of work on this project. Results of reference testing shall indicate an acceptable rating for the laboratory to be considered by the Owner and Architect/Engineer.

C. Laboratory: Authorized to operate in the State in which Project is located.

D. Laboratory Staff: Maintain a full time registered Professional Engineer on staff to review services.

E. Testing Equipment: Shall be calibrated at reasonable intervals with devices of accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.

1.7 CONTRACTOR SUBMITTALS

A. PRIOR TO START OF WORK, submit testing laboratory name, address, and telephone number, and names of full time registered Engineer and responsible officer.

B. Submit copy of report of laboratory facilities inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.

1.8 LABORATORY RESPONSIBILITIES

A. Test samples of required items submitted by Contractor.
B. Provide qualified personnel at site. Cooperate with Architect/Engineer and Contractor in performance of services.

C. Perform specified inspecting, sampling, and testing of Products in accordance with specified standards.

D. Ascertain compliance of materials and mixes with requirements of Contract Documents.

E. Promptly notify Architect/Engineer and Contractor of observed irregularities or non-conformance of Work or Products.

F. Perform additional inspection and tests required by Architect/Engineer.

1.9 LABORATORY REPORTS

A. After each inspection and test within five (5) business days, promptly submit three (3) copies of laboratory report to Owner, Architect/Engineer, and to Contractor. Include:

1. Date issued
2. Project title and number
3. Name of inspector
4. Date and time of sampling or inspection
5. Identification of product and specifications section
6. Location in the Project
7. Type of inspection or test
8. Date of test
9. Results of tests

B. When requested by Architect/Engineer, provide interpretation of test results.

1.10 LIMITS ON TESTING LABORATORY AUTHORITY

A. Laboratory MAY NOT release, revoke, alter, or enlarge on requirements of Contract Documents.

B. Laboratory MAY NOT approve or accept any portion of the Work.

C. Laboratory MAY NOT assume any duties of Contractor.

D. Laboratory HAS NO authority to stop the Work.

1.11 CONTRACTOR RESPONSIBILITIES

A. Deliver to laboratory at designated location, adequate samples of materials proposed to be used, which require testing.

B. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers’ facilities.

C. Provide incidental labor and facilities:

1. to provide access to Work to be tested,
2. to obtain and handle samples at the site or at source of Products to be tested,
3. to facilitate tests and inspections,
4. to provide storage and curing of test samples.

D. Notify Architect/Engineer, Owner and laboratory 24 hours prior to expected time for operations requiring inspecting and testing services.

PART 2–PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 014100
SECTION 014200 - REFERENCE STANDARDS

PART 1 –GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, General Conduct of the Work and Special Requirements, Supplementary Conditions, and other Division 1 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1.2 DEFINITIONS

A. General: Basic contract definitions are included in the Conditions of the Contract.

B. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on the Drawings; or to other paragraphs or schedules in the Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference. Location is not limited.

C. "Directied": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by the Architect, requested by the Architect, and similar phrases, unless any item associated with these terms will result in a monetary change order to the project. If the items associated with these terms require a change order the Owner must be notified prior to any action being taken.

D. "Approved": The term "approved," when used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, and the Architect's and Owners duties and responsibilities are limited as specified by the Conditions of the Contract.

E. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conversations and agreements within the construction industry that control performance of the Work.

F. "Furnish": The term "furnish" means to supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": The term "install" describes operations at the Project site including the actual unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.

I. "Installer": An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, or similar operations. Installers are
required to be experienced in the operations they are engaged to perform.

1. The term "experienced," when used with the term "installer," means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction.

2. Trades: Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name. However, work resulting from any construction activity performed by a "Trade" must meet all quality standards acceptable to the Architect and Owner.

J. "Project site" is the space available to the Contractor for performing construction activities, either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.

K. "Testing Agencies": A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

L. If Requested: If requested by the Owner.

M. Where: Where or when practicable in the judgment of the Owner.

N. Satisfactory: Acceptable in the judgment of the Owner.

O. As Required: As required by the Architect, or as field conditions dictate.

P. Replace: To remove an existing product or service, and furnish and install an indicated product in its place.

Q. Specifications: The total and complete specifications of this Project as identified by the Architect, and the Architects consultants through the Architect, including referenced standard specifications, the General Specifications and the Technical Specifications as indexed.

R. System/ Assembly: In the context of this Project, where a 'system' or an 'assembly' as indicated in the Specifications and/or Drawings, it shall consist of the sum of all the relevant parts and/or materials specific to the use of the system or assembly indicated; installed complete, in place, and in working order. All said parts and/or materials required for a complete system indicated, shall be supplied and installed as part of the Base Bid Price for a complete, proper, and fully functional installation, whether specifically detailed or not. All materials for the system or assembly shall be installed completely, all necessary connections to other construction shall be provided. Upon completion of this system or assembly, the sum of all the parts that constitute the make-up of this unit, shall function and/or operate properly according to its intended design.

S. Mandatory: Means as required by code, any Building Authority, and any and all governing laws. All mandatory requirements for construction shall be included in the Base Bid Price for the Project.

T. Functional: Items(s) installed that are to operate properly or as intended.
U. Typical: A condition, detail, or other item that is common to an identified system, assembly, or any other construction condition where the essential characteristics are the same.

1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION

A. Specification Format: These Specifications are organized into Divisions and Sections based on the 16-division format and CSI/ICSC’s “MasterFormat” numbering system.

B. Specification Content: These Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows.

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be interpolated, as the sense requires. Singular words shall be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.
   a. The Technical Specifications are of the abbreviated type and include incomplete sentences. Omissions of words or phrases such as “the Contractor shall”; “in conformance with”; “shall be”; “as noted on the Drawings”; “according to the Plans”; “a” “an”; “the”; and “all” are intentional. Omitted words and phrases shall be supplied by inference in the same manner, as they are when a “note” occurs on the Drawings. Works “shall be” “shall have”, and “shall” will be supplied by inference where a colon (:) is used within sentences or phrases.

2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Section Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor or by others when so noted.
   a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
   b. Abbreviated references to trade associations, technical societies, recognized authorities and other institutions are included in the contract documents. Any abbreviation or organization not recognized by the Contractors shall be requested from the Architect for interpretation. Failure to request and receive an interpretation shall not relieve the Contractor from performing and/or supplying materials or workmanship in compliance with specified references to the satisfaction of the Architect or Owner.

C. References: References to known standard specifications shall mean and intend the latest edition of such specifications adopted and published as of the date of the invitation to bid.

D. Divisions: Divisions of the specifications into sections is done for the convenience of reference and is not intended to control the Contractor in dividing the Work among subcontractors or to limit the scope of work performed by any trade under any section.

1.4 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a past of the Contract Documents by reference.
B. Publication Dates: Comply with standards in effect as of the date of the Contract Documents.

C. Conflicting Requirements: Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to the Architect for a decision before proceeding.

1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to the Architect for a decision before proceeding.

D. Copies of Standards: Each entity engaged in construction on the Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source and make them available on request.

E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards-producing organization, authorities having jurisdiction, or other entity applicable to the context of the text provision. Refer to Gale Research's "Encyclopedia of Associations" or Columbia Books’ "National Trade & Professional Associations of the U.S.,” which are available in most libraries.

1.5 GOVERNING REGULATIONS AND AUTHORITIES

A. Copies of Regulations: Obtain copies of the following regulations and retain at the Project site to be available for reference by parties who have a reasonable need:

1. Any and all Federal, State or Local regulations required by the Agency having jurisdiction to be retained or posted at the project site

1.6 SUBMITTALS

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

1.7 DRAWINGS

A. The Contractor shall provide all quantities, items, articles, materials, operations, or methods listed, mentioned, implied, scheduled, or specified, on the Drawings, including all labor, materials, equipment, and incidentals required for their completion.

B. Intent of the Drawings:
1. As with any plan, the Contractor shall be responsible for verifying all field conditions, whether or not noted in the plans prior to construction. Any discrepancies shall be resolved with the Owner prior to construction. The start of construction will not be delayed due to the Contractors need to verify all field conditions. Verification of items must be scheduled by the Contractor so as not to impede the progress of the work. The Contractor shall be responsible for correcting damage resulting from Contractor’s failure to verify field conditions. Architect/Engineer and Owner liability for accuracy of survey information.

2. The implied intent of the Drawings, includes the overall layout of the Project, inclusive of site structures, site improvements, location of all items required during construction, the extent of construction and the extent of the materials.

3. All such Drawings and Specifications constitute the Project as a whole, and are as a result, directly related to one another. The Drawings and Specifications are not divided into, or are intended to be divided into separate entities according to building trades or local practice. It is the responsibility of the Contractor to disseminate all information represented on the Drawings and Specifications so that all trades and sub-trades will have complete and thorough knowledge of the Project intent. No requests for Change Orders, time extensions, or other considerations will be accepted if the Contractor fails to properly coordinate information to the various trades/sub-trades.

PART 2 - PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 014200
SECTION 015000 – CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions, and other Division 1 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1.2 SUMMARY

A. This Section includes requirements for construction facilities and temporary controls, including temporary utilities, support facilities, and security and protection. Temporary utilities include, but are not limited to, the following:

1. Temporary water service and distribution.
2. Temporary electric power and light.
3. Temporary heat.
4. Telephone service.
5. Sanitary facilities, including drinking water.
6. Storm and sanitary sewer.

B. Support facilities include, but are not limited to, the following:

1. Field offices and storage sheds.
2. Temporary roads, paving and truck wash-down station.
3. Dewatering facilities and drains.
4. Temporary enclosures.
5. Hoists.
6. Temporary project identification signs and bulletin boards.
7. Waste disposal services.
8. Rodent and pest control.
9. Construction aids and miscellaneous services and facilities.
10. Security and protection facilities include, but are not limited to, the following:

C. Security and protection facilities include, but are not limited to, the following:

1. Temporary fire protection.
2. Barricades, warning signs, and lights.
3. Sidewalk bridge or enclosure fence for the site.
4. Environmental protection.

D. The Contractor is responsible for all costs associated with the supply, maintenance or usage of temporary utilities and construction related facilities unless indicated otherwise in this Section.

1.3 QUALITY ASSURANCE

A. Regulations: Comply with industry standards and applicable laws and regulations of
authorities having jurisdiction including, but not limited to, the following:

1. Building code requirements.
2. Health and safety regulations.
3. Utility company regulations.
4. Police, fire department, and rescue squad rules.
5. Environmental protection regulations.


   1. Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70 "National Electric Code."

C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.4 PROJECT CONDITIONS

A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility.

B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services and facilities as the Work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire-prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on-site.

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

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide new materials. If acceptable to the Owner, the Contractor may use undamaged, previously used materials in serviceable condition. Provide materials suitable for use intended.

B. Paint: Comply with requirements.

   1. For job-built temporary offices, shops, sheds, fences, and other exposed lumber and plywood, provide exterior-grade acrylic-latex emulsion over exterior primer.
   2. For sign panels and applying graphics, provide exterior-grade alkyd gloss enamel over exterior primer.

C. Tarpaulins: Provide waterproof, fire-resistant, UL-labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosures, provide translucent, nylon-reinforced, laminated polyethylene or polyvinyl chloride, fire-retardant tarpaulins.

D. Water: Provide potable water approved by local health authorities.
2.2 EQUIPMENT

A. General: Provide new equipment. If acceptable to the Owner, the Contractor may use undamaged, previously used equipment in serviceable condition. Provide equipment suitable for use intended.

B. Water Hoses: Provide 3/4-inch, heavy-duty, abrasion-resistant, flexible rubber hoses 100 feet long, with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge.

C. Electrical Outlets: Provide properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-Volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button, and pilot light for connection of power tools and equipment.

D. Electrical Power Cords: Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.

E. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered-glass enclosures where exposed to breakage.

F. Fire Extinguishers: Provide hand-carried, portable, UL-rated; Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for the exposures.

1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work and the areas adjacent to the Work area. Relocate and modify facilities as required.

B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Engage the appropriate local utility company to install temporary service or connect to existing service. Where company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with company recommendations.

1. Arrange with company and existing users for a time when service can be interrupted, if necessary, to make connections for temporary services.
2. Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.
3. Obtain easements to bring temporary utilities to the site where the Owner's
easements cannot be used for that purpose.
4. Use Charges: Cost or use charges for temporary facilities are not chargeable to the Owner. Neither the Owner will accept cost or use charges as a basis of claims for Change Orders.
5. Install services to cause minimum disruption to area’s adjacent to the work area.
6. Add provisions for work not in Contract but served by temporary facilities, if required.

B. Water Service: Contractor may use existing water service in the area of work.
C. Temporary Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnects, automatic ground-fault interrupters, and main distribution switchgear. \textbf{Cost of temporary electric power usage is the Contractors responsibility. Cost shall be included in the bid.}

D. Initial temporary service shall be three (3) phase, or single phase. Temporary light and power installations, wiring and miscellaneous electrical hardware must meet the electric code. Electrical characteristics shall be provided to meet all temporary light and power reasonably required as herein and hereinafter specified or as included under the general conditions. The contractor shall pay the cost of running temporary services. \textbf{All costs shall be included in the bid.}

1. Power Distribution System: Install wiring overhead and rise vertically where least exposed to damage. Where permitted, wiring circuits not exceeding 125 Volts, ac 20 Ampere rating, and lighting circuits may be nonmetallic-sheathed cable where overhead and exposed for surveillance.

E. Power outlets shall be fed independently of the temporary lighting system. The extension of service shall include the necessary wiring of sufficient capacity to the location of the well for the operation of the well pump in the event a water well is the source of water supply for the project. Where service of a type other than herein mentioned is required, the contractor requiring it shall pay all costs of such special service.

F. Temporary Lighting: Provide temporary lighting with local switching. \textbf{Cost of temporary lighting usage is the contractors' responsibility. Cost shall be included in the bid.}

1. The contractor shall provide double sockets at a maximum of thirty feet (30') on centers in large areas. One (1) socket shall contain a 150-watt lamp and the other socket shall be a grounding type to accept a receptacle plug for small, single-phase loads to be used for short periods of time.
2. Install and operate temporary lighting that will fulfill security and protection requirements without operating the entire system. Provide temporary lighting that will provide adequate illumination for construction operations and traffic conditions.

G. The contractor shall observe the requirements of the Federal Occupational Safety and Health Act (OSHA) of 1970 with regard to temporary light and power.

H. Temporary Heat: Provide temporary heat required by construction activities. Select safe equipment that will not have a harmful effect. \textbf{Any cost associated with the supply, maintenance and usage of temporary heat will be the responsibility of the contractor. Cost of temporary heat shall be included in the bid.}

I. Use of gasoline-burning space heaters, open flame, or salamander heating units is prohibited.
J. Should electricians be required to supervise and maintain equipment required for the provision of heat, the payment for the services of the supervisors and/or maintenance personnel shall be the responsibility of the Contractor. The contractor shall pay the cost of all fuel consumed in the operation of the generating unit for supplying temporary heat.

K. All heating equipment shall be NFPA approved. Heaters shall be approved by a recognized testing laboratory and must be equipped with a positive shut-off safety valve. Notwithstanding the above, all temporary heating equipment will comply with all Federal and State laws and regulations.

L. Temporary Telephones: Contractor shall utilize their own cell phones for service.

M. The contractor may utilize the Owner’s sanitary/wash facilities, drinking water, etc. if these amenities are available. The contractor shall only use these facilities with Owner’s permission. The contractor will be responsible to reimburse the Owner for all Owner provided utilities use by the Contractor. Further, should the contractor elect to utilize Owner provided utilities the contractor will be responsible to repair all damage and replace all damaged items before the project will be considered substantially completed. The Owner will not be required to make final payment to the contractor until such damage is repair or replaced to its original or better than original condition.

3.3 SUPPORT FACILITIES INSTALLATION

A. Temporary storage sheds are not permitted on the Owner’s property.

B. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.

1. Where temporary wood or plywood enclosure exceeds 100 sq. ft. in area, use UL-labeled, fire-retardant-treated material for framing and main sheathing.

C. Temporary Lifts and Hoists: Contractor may utilize the existing elevator for bringing materials to the area of work and disposing materials to the area of work provided that:

1. The Contractor provides temporary protection materials, padding, etc. for the elevator cab.
2. The Contractor observes the weight capacity of the existing elevator cab.
3. The Contractor is only permitted to use the existing elevator from the hours of 9:00 p.m. to 6:00 a.m. Monday through Friday.
4. The Contractor notify the Owner of the elevator use three (3) business days prior to use.

D. Project Identification and Temporary Signs: Prepare project identification and other signs of size indicated. Install signs where indicated to inform the public and persons seeking entrance to the Project. Support on posts or framing of preservative-treated wood or steel. Do not permit installation of unauthorized signs.

1. Temporary Signs: Prepare signs to provide directional information to construction personnel and visitors.

E. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal weather
or 3 days when the temperature is expected to rise above 80 deg F. Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material lawfully.

1. Provide containers with lids. Dispose of waste off-site periodically.

F. Individual Project circumstances may require use of other construction aids and miscellaneous facilities, such as walkways, scaffoldings, platforms, swing stages, ramps and bridges, incidental sheeting and shoring, demolition waste chutes, and similar construction aids. Add requirements as necessary to suit Project.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION


1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stair-well.
2. Store combustible materials in containers in fire-safe locations.
3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for fighting fires. Prohibit smoking in hazardous fire-exposure areas.
4. Provide supervision of welding operations, combustion-type temporary heating units, and similar sources of fire ignition.

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. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

1. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.

D. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted or that other undesirable effects might result. Avoid use of tools and equipment that produce harmful noise. Restrict use of noise-making tools and equipment to hours that will minimize complaints from persons or firms near the site.

1. No burning will be permitted on the site.
2. It will be the Contractor’s responsibility to control dust by a means acceptable to the Owner. The Contractor shall make due allowance in his bid to cover these non-productive costs.

E. Protection of Utilities:
1. The Contractor shall exercise special care when working near existing utility installations such as lights, ducts, structures, underground trench laid cables, cable markers, pads, water lines, underground oil lines, railroads and other installations, to ensure that no damage is done to them and that the underground wiring to such utilities is not damaged or rooted out, or pipelines broken or punctured.

2. If the Contractor damages any installation, the Contractor shall repair at no cost to the Owner the damaged item to the Owner’s satisfaction. At the Owners discretion, repairs will be done continuously on a 24-hour per day basis until completed. The Contractor shall submit for approval the name of an electrical contractor and a plumbing contractor who shall be available on a 24 hour a day basis to affect any repairs as may be necessary due to Contractor error.

3. The Contractor shall obtain (if available) as-built site underground information prior to beginning excavation to minimize the possibility of interruption or damage to existing facilities. The lack of this information shall not excuse damage to the utilities by the contractor or the requirement to make necessary repairs immediately, the Contractor shall pay for Cost of the repair work.

F. Protection and Restoration of Property and Landscape: The Contractor shall be responsible for the preservation of all public and private property. All land monuments and property markers shall be preserved until the Owner has witnessed and recorded their location.

G. Protection of Existing Trees, Shrubs, and Vegetation to Remain: Contractor shall take all means necessary to protect existing trees, shrubs, and vegetation. Contractor and its forces shall abide by the boundaries set by the Drawings for the protection of root systems of all designated trees, shrubs and vegetation. Protection shall be completely in place prior to the start of construction work in any area. Contractor shall clearly mark all restricted areas as indicated on the Drawings and prevent the use of the area by all personnel and equipment until final cleanup.

H. Project Security:

1. The Contractor shall be responsible for monitoring all personnel requiring access to the work site including his personnel, subcontractor’s personnel, other contractors working in the same construction area, material delivery trucks, authorized visitors to the site, etc.

2. The Contractor shall be held responsible for the security and protection of its own, subcontractors and sub-subcontractors equipment, vehicles, trailers, tools, materials, and all other items necessary for the work under this Contract.

3. The Contractor shall be held responsible for the admission of any unauthorized personnel into his work area.

4. In general, provide security and facilities to protect Work, existing facilities, and the Owner’s operations from unauthorized entry, vandalism or theft.

3.5 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.

B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.

1. Protection: Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

C. Termination and Removal: Unless the Owner requests that it be maintained longer, remove
each temporary facility when the need has ended or no later than Substantial Completion. Complete or, if necessary, restore existing permanent construction that may have been damaged as a result of the use, maintenance or operation of temporary facility for this project. Repair damaged new work, repair or replace, as directed by the Owner, existing work and or conditions, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired as a result of the use, maintenance or operation of temporary facilities for the project.

1. Where the area is intended for future landscape development, remove any material, equipment, debris, trash, soil and aggregate fill used as part or in conjunction with the project that do not comply with requirements for fill or subsoil in the area. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks damaged during and as a result of work conducted as part of this project. Replace and/or repair as required and direct by the governing authority and the Owner.

END OF SECTION 015000
SECTION 015639 – TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
   A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.
   B. Related Sections:
      1. Division 01 Section “Construction Waste Management”
      2. Division 01 Section “Field Engineering” for field engineering and surveying.
      3. Division 32 Section “Soil Preparation”
      4. Division 32 Section “Plants”

1.3 DEFINITIONS
   A. Caliper: Diameter of a trunk measured by a diameter tape at 6 inches above the ground for trees up to, and including, 6-inch size; and breast height (DBH) for trees larger than 6-inch size.
   B. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.
   C. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and indicated on Drawings.
   D. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 SUBMITTALS
   A. Product Data: For each type of product indicated.
   B. Samples for Verification: For each type of the following:
      1. Protection-Zone Fencing: Manufacturer’s cut sheets
      2. Protection-Zone Signage: Manufacturer’s cut sheets.
      3. Organic Mulch: One (1) gallon of organic mulch; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch.
   C. Tree Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.
1. Species and size of tree.
2. Location on site plan. Include unique identifier for each.
3. Reason for pruning.
4. Description of pruning to be performed.

D. Qualification Data: For qualified arborist and tree service firm.

E. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.

F. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.

G. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.
   1. Use sufficiently detailed photographs or videotape.
   2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

1.5 QUALITY ASSURANCE

A. Arborist Qualifications: Certified Arborist as certified by ISA.

B. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.

C. Pre-installation Conference: Conduct conference at Project site.
   1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:
      a. Construction schedule. Verify availability of materials, personnel, and equipment needed to make progress and avoid delays.
      b. Enforcing requirements for protection zones.
      c. Arborist’s responsibilities.
      d. Field quality control.

1.6 PROJECT CONDITIONS

A. The following practices are prohibited within protection zones:
   1. Storage of construction materials, debris, or excavated material.
   2. Parking vehicles or equipment.
   3. Foot traffic.
   4. Erection of sheds or structures.
   5. Impoundment of water.
   6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

B. Do not direct vehicle or equipment exhaust toward protection zones.

C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

D. Protection fencing must be approved by the Owner’s Representative prior to commencing with any demolition or construction work.

E. Install protection fencing before installing erosion and sedimentation controls. Trenched silt fence is prohibited within plant protection zones. Utilize tubular sediment control device, such as Filtrexx® Sediment Control or similar product in accordance with the manufacturers instructions, in lieu of silt fencing. Trenching is prohibited within plant protection zones.

F. Flows of water redirected from construction areas or generated by construction activity are prohibited from entering or crossing plant protection zones. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

G. Work within the plant protection zone must be approved by and supervised by Owner’s Representative.

H. The Owner’s Representative may require additional protection fencing or relocation of fencing as work progresses.

I. Bring any unforeseen site conditions, such as structural roots, that will impact new construction to the attention of the Architect and Owner’s Representative. Do not proceed with work without written authorization.

J. Arborist may require crown pruning to compensate for root loss caused by damaging or cutting of the root system. Provide subsequent maintenance during contract period as recommended by arborist.

PART 2 - GENERAL

2.1 MATERIALS

A. Topsoil: Refer to 329100 ‘Soil Preparation’.

B. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:
   1. Type: Shredded hardwood.
   2. Size Range: 3 inches (76 mm) maximum, ½ inch (13 mm) minimum.

C. Protection-Zone Fencing: Fencing fixed in position and meeting the following requirements.
   1. Safety Fence: 4’ high plastic orange safety fence; 6’ tall steel posts with tie wires, and other accessories for a complete fence system.
D. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes prepunched and reinforced; legibly printed with nonfading lettering and as follows:

1. Size and Text: TREE PROTECTION AREA – DO NOT ENTER
2. Lettering: 3-inch high minimum, white characters on red background.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

B. For the record, prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.

3.2 PREPARATION

A. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

3.3 TREE- AND PLANT-PROTECTION ZONES

A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people from easily entering protected area except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.

B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Architect. Install one sign spaced approximately every 35 feet on protection-zone fencing, but no fewer than four signs with each facing a different direction.

C. Maintain protection zones free of weeds and trash.

D. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.

E. Maintain protection-zone fencing and signage in good condition as acceptable to Architect and remove when construction operations are complete and equipment has been removed from the site.

1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
2. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

3.4 EXCAVATION
   A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 312000 “Earth Moving.”
   B. Trenching near Trees: Where utility trenches are required within protection zones, hand excavate and/or air-spade under or around tree roots or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning.
   C. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

3.5 ROOT PRUNING
   A. Prune roots that are affected by temporary and permanent construction. Prune roots as follows:
      1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
      2. Cut Ends: Do not coat cut ends of roots with an emulsified asphalt or similar coatings.
      3. Temporarily support and protect roots from damage until they are covered with soil.
      4. Cover exposed roots with burlap and water regularly.
      5. Backfill as soon as possible according to requirements in Section 312000 “Earth Moving.”
   B. Root Pruning at Edge of Protection Zone: Prune roots 6 inches inside of the protection zone, by cleanly cutting all roots to the depth of the required excavation.
   C. Root Pruning within Protection Zone: Clear and excavate by hand to the depth of the required excavation to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

3.6 CROWN PRUNING
   A. Prune branches that are affected by temporary and permanent construction. Prune branches as follows:
      1. Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by arborist.
      2. Pruning Standards: Prune trees according to ANSI A300 (Part 1) and the following:
         a. Type of Pruning: Cleaning, Thinning, and/or Reduction.
         b. Specialty Pruning: Restoration.
3. Cut branches with sharp pruning instruments; do not break or chop.
4. Do not apply pruning paint to wounds

B. Chip removed branches and dispose of off-site.

3.7 REGRADING

A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

B. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as required for root pruning.

1. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as required for root pruning.

C. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

D. Minor Fill within Protection Zone: Where existing grade is 2 inches or less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.

3.8 FIELD QUALITY CONTROL

A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.9 REPAIR AND REPLACEMENT

A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.

1. Submit details of proposed root cutting and tree and shrub repairs.
2. Have arborist perform the root cutting, branch pruning, and damage repair of trees and shrubs.
3. Treat damaged trunks, limbs, and roots according to arborist’s written instructions.
4. Perform repairs within 24 hours.
5. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by Architect.

B. Trees: Remove and replace trees indicated to remain that are more than 25 percent dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that Landscape Architect determines are incapable of restoring to normal growth pattern.

1. Provide new trees of same size and species as those being replaced for each tree that measures 6 inches or smaller in caliper size.
Westby Hall  
Facade & Courtyard Restoration

2. Provide two new trees of 4-inch caliper size for each tree being replaced that measure between 6-inch caliper and 8-inch caliper in size at a location directed by the Owner or Owner’s Representative.

3. Provide 6-inch caliper size for each tree being replaced that measure greater than 8-inch caliper in size at a location directed by the Owner or Owner’s Representative. Quantity of trees shall equal the total diameter at breast height (DBH) size of the tree removed unless directed otherwise by the Owner. For example, a 32-inch DBH shall require five new trees.

4. Species: Species selected by Landscape Architect.

5. Plant and maintain new trees as specified in Section 32 93 00 ‘Plants’.

C. Soil Aeration: Where directed by Landscape Architect, aerate surface soil compacted during construction. Aerate to extent as directed by Landscape Architect beyond drip line and no closer than 36 inches to tree trunk. Drill 2-inch diameter holes a minimum of 12 inches deep at 24 inches o.c. Backfill holes with approved Compost.

3.10 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove excess excavated material, displaced trees, trash and debris, and legally dispose of them off Owner’s property.

END OF SECTION 015639
SECTION 01721 - FIELD ENGINEERING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK
A. The Contractor shall engage the services of a Surveyor to establish grades, lines and levels.
B. The Contractor shall be responsible for layout of his own work, from grades, lines and levels established by the General Contractor.

1.2 RELATED REQUIREMENTS
A. Applicable provisions of Bidding Requirements, Contract Requirements in Division 0 and all applicable Division 1 sections.

1.3 QUALITY ASSURANCE
A. Surveyor shall be licensed in New Jersey.

1.4 SUBMITTALS
A. Submit name, address, and telephone number of Surveyor prior to starting survey work.
B. On request, submit documentation verifying accuracy of survey work.
C. Submit reference point survey including field notes for record.
D. Submit certification, signed and sealed by the Surveyor showing that elevations and locations of all improvements are or are not in conformance with Contract Documents.

1.5 PROJECT RECORD DOCUMENTS
A. Maintain complete, accurate log of control and survey work as it progresses.
B. Record on record documents all pertinent information under provisions of Division 1.

PART 2 PRODUCTS
Not Used

PART 3 EXECUTION

3.1 INSPECTION
A. Verify locations of survey control points prior to starting work. Promptly notify Design Professional of any discrepancies discovered.
3.2 SURVEY REFERENCE POINTS
   A. Protect survey control points prior to starting site work; preserve permanent reference points during construction. Make no changes without prior written notice to Design Professional.
   B. Promptly report to Project Coordinator destruction of any reference point or relocation required because of changes in grades or other reasons. Replace dislocated survey control points based on original survey control.

3.3 SURVEY REQUIREMENTS
   A. Use instruments to establish a minimum of two (2) permanent bench marks on the site. Reference benchmarks to data established by survey control points. Record bench mark locations with horizontal and vertical data for Project Record Documents. Reference these benchmarks to finish floor lines. Provide accurate alignment and level of the work, and correct slope and curvatures as required.
   B. Periodically verify layouts by same means. No extra charges will be allowed for differences between dimensions shown and actual measurements. Advise the Project Coordinator of any differences.
   C. Prepare as-built survey in AutoCAD format for Owner.

END OF SECTION
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Inspection procedures.
2. Project record document submittal.
3. Operation and maintenance manual submittal.
4. Submittal of warranties.
5. Final cleaning.

B. Closeout requirements for specific construction activities are included in the appropriate Drawings.

1.3 SUBSTANTIAL COMPLETION

A. Substantial Completion: The date of Substantial Completion for the Work, or designated portion thereof, is the date certified by the Architect when the construction is sufficiently complete, in accordance with the Contract Documents, so that the Owner may occupy the project, or the designated portions thereof, for the use for which it was intended PRIOR to the Mandatory Completion Date. Substantial Completion shall be accomplished and the full project and all designated portions thereof, read for use and occupancy by the Owner by the completion milestone deadline listed below. It shall be the responsibility of the Contractor to notify the Architect and Owner in not less than seven (7) calendar days prior to the Substantial Completion Milestone deadline for a “substantial completion” inspection. The University shall issue a Certificate of Substantial Completion (AIA Document G704) at the point in time when the inspection has been fully completed and the appropriate approvals and certificates have been granted by governing authorities and obtained by the Contractor.

IT IS THE INTENT OF THESE SPECIFICATIONS THAT SUBSTANTIAL COMPLETION IS ACHIEVED NO LATER THAN THE DATES AS OUTLINED IN SECTION 011000 “SUMMARY”. THE CONTRACTOR MUST INCLUDE ANY AND ALL COSTS INCLUDING ANY OVERTIME NECESSARY TO ATTAIN SUBSTANTIAL COMPLETION BY THE DEADLINE LISTED IN SECTION 011000 BASED UPON BEING AWARDED THE PROJECT BY THE DATE LISTED IN SECTION 011000.

B. LIQUIDATED DAMAGES ARE PART OF THIS PROJECT. These will be assessed at the following rates:

1. $1,000.00 per calendar day for each day beyond substantial completion.
C. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. List items below that are incomplete in request.

1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete.
   a. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
   b. If 100 percent completion cannot be shown, include a list of incomplete items (a project punch list), the value of incomplete construction, reasons the Work is not complete, and a timeline during which the work must be completed.

2. Advise Owner of pending insurance changeover requirements.

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

4. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.

6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.

7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.

8. Complete startup testing of systems and instruction of the Owner's operation and maintenance personnel.

9. Disconnect and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.

10. When mechanical, electrical or other equipment is installed, it shall be the responsibility of the contractor to maintain, warrant and operate it for such period of time as required by the contract documents or as necessary for the proper inspecting and testing of the equipment for adequately instructing the University's operating personnel. All costs associated with the maintenance, warranty, operations, inspection and testing of equipment in addition to instructing University personnel shall be borne by the contractor. All tests shall be conducted in the presence of and upon timely notice to the contracting officer, Project Manager and Architect/Engineer prior to acceptance of the equipment.

11. Owner’s warranties will start at Final Acceptance of the Project.

D. Pre-final Inspection:

1. When the Contractor has completed all work and is satisfied the Project is in compliance with the Contract Documents, it will notify the Owner and Architect, in writing, that the Project is complete and ready for inspection. The Owner and Architect will arrange for and conduct an inspection of the Project by the Owner, Architect, Engineers and the Contractor. The Owner will be provided with a reasonable time to arrange for and conduct an inspection.

2. The Owner and Architect will document any deficiencies on a written punch list and will arrange a meeting with the Contractor to review the punch list, explain deficient items and designate a time frame in which the punch list must be completed. The Contractor will correct all the deficiencies within the designated time frame and notify the Owner in writing, when the Project is ready for re-inspection. The Owner will arrange and conduct the re-inspection of the Project to review the corrected items.
3. The formal list of deficiencies found shall not be considered a final list of all deficient items. Any deficiencies found during instructions to the Owner, inspection for Substantial Completion, beneficial occupancy, or inspection for final acceptance, the Contractor will correct all deficient items per the contract documents prior to final acceptance.

E. Substantial Completion:

1. Upon completion of deficient items and instruction to the Owner, the Contractor will arrange for an inspection of the Project with the Owner and the Architect. This inspection may result in a list of additional items to complete after occupancy, but before final payment and/or may require additional correction prior to occupancy by the Owner.

2. Upon formal notice from the Owner, the Contractor shall then arrange for the submission of all outstanding record documents, including: maintenance manuals, guarantees, warranties, maintenance contracts, and any additional instructions necessary for the operation of the project. The Contractor shall acquaint the Owner with acceptance tests, guarantees, warranties, and maintenance manuals. The Contractor shall also obtain a ‘Certificate of Occupancy’ or similar releases required to permit the Owner’s occupancy of the Project.

3. Should the instruction period find deficiencies, the Owner will notify the Contractor in writing of deficient items.

4. If the inspection confirms that the Project is ‘substantially complete’ and is ‘ready for occupancy’, the Owner through the Architect/Engineer will issue a ‘Certificate of Substantial Completion’. The Certificate will confirm that the Project can be occupied for its intended use. Attached to the Certificate will be any final punch list to be completed. Prior to issuance of the Certificate, the Contractor shall submit a schedule for completion of remaining deficiencies, approved or amended by the Owner.

5. Inspection Procedures: On receipt of a request for inspection, the Architect will either proceed with inspection or advise the Contractor of unfilled requirements. The Architect will prepare the Certificate of Substantial Completion following inspection or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.

a. The Architect will repeat inspection when requested and assured that the Work is substantially complete.

b. Results of the completed inspection will form the basis of requirements for final acceptance.

1.4 BENEFICIAL OCCUPANCY

A. Upon issuance of the ‘Certificate of Substantial Completion’, the Owner may then occupy the Project (or the designated area of the Project).

1.5 FINAL ACCEPTANCE

A. Final Inspection: Upon completion of any remaining deficiencies the Contractor shall notify the Owner in writing, that the Project is complete and ready for final inspection. The Contractor shall arrange for and conduct the final inspection of the Project with the Owner.

B. Final Acceptance: If the final inspection indicates satisfactory completion of the Work, the Owner through the Architect/Engineer will issue a Change Order adjusting to the final quantities. Following acceptance of the final Change Order, receipt of required affidavits, final release of liens, consent of surety for final payment along with all other documentation required by the contractor documents, the Owner through the Architect will authorize a final Certificate for Payment.
1. Mandatory or Final Completion: Final Completion shall be accomplished and the full project, and all designated portions thereof, completed and ready for use without any further work required within the time frame identified for each phase of work from the date of issuance and as listed on the Certificate of Substantial Completion by the Architect.

2. The guarantee period for all materials, equipment and workmanship shall start on the date of ‘Final Acceptance’ unless otherwise noted on the Certificate.

C. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.

1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.

2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.

3. Submit a certified copy of the Architect’s final inspection list of items to be completed or corrected, endorsed and dated by the Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and shall be endorsed and dated by the Architect.

4. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion or when the Owner took possession of and assumed responsibility for corresponding elements of the Work.

5. Submit consent of surety to final payment.

6. Submit a final liquidated damages settlement statement.

7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

D. Re-inspection Procedure: The Architect will re-inspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Owner.

1. Upon completion of re-inspection, the Architect will prepare a certificate of final acceptance. If the Work is incomplete, the Architect will 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-inspection will be repeated.

3. Should the Project require inspections beyond the inspections noted above, i.e. a pre-final and a final inspection only the Owner will reduce from the Contractor’s final payment those monies necessary to provide for the cost of the additional inspections. The reduction shall not be considered as a part of any “Liquidated Damages” for failure to complete within the specified Contract Time. The reduction shall not be considered as a penalty to the Contractor; but shall be for the actual cost of monies required for the reimbursement of fees for the Architect, Engineers, Owner and any other specialists necessary for obtaining final approval of the Work.

1.6 EXCESSIVE DEFICIENCIES

A. During any inspection for Project completion, if it is determined by the Owner, that the Contractor has not sufficiently completed the Work in compliance with the Contract Documents, the Owner may declare that the Project is not sufficiently complete to continue the inspection of the Work. Within three (3) working days of this declaration, the Owner will issue in writing, a list of excessive deficiencies found. Upon receipt of the Owners notice of excessive deficiencies the Contractor will have ten (10) working days to remove such deficiencies. If such deficiencies have not been corrected in the time frame herein specified
the Owner can at its’ option complete the Work. Any costs incurred by the Owner as a result of its’ assuming the responsibilities of the Contractor in this regard will be deducted from any monies remaining to be paid to the Contractor. Should the costs associated with the Owner having to assume responsibility for the work to correct excessive deficiencies exceed the amount of funds remaining to be paid the Contractor shall be liable to the Owner for the difference.

1.7 RECORD DOCUMENT SUBMITTALS

A. General: Do not use record documents for construction purposes. Protect record documents from deterioration and loss in a secure, fire-resistant location. Provide access to record documents for the Architect’s reference during normal working hours.

1. All of the record documentation listed herein shall be provided by the Contractor in hard copy and digitally. Digital copies shall be provided by the Contractor in PDF format, and issued to the Owner via CD. Hard copy shall be provided by the Contractor in an 8-1/2” x 11” binder.

B. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies from the Work as originally shown. Mark which drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

1. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.
2. Mark new information that is important to the Owner but was not shown on Contract Drawings or Shop Drawings.
3. Note related change-order numbers where applicable.
4. Organize record drawing sheets into manageable sets. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.

C. Record Specifications: Maintain one complete copy of the Project Manual, including addenda. Include with the Project Manual one copy of other written construction documents, such as Change Orders and modifications issued in printed form during construction.

1. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.
2. Give particular attention to substitutions and selection of options and information on concealed construction that cannot otherwise be readily discerned later by direct observation.
3. Note related record drawing information and Product Data.
4. Upon completion of the Work, submit record Specifications to the Architect for the Owner’s records.

D. Record Product Data: Maintain one copy of each Product Data submittal. Note related Change Orders and markup of record drawings and Specifications.

1. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site and from the manufacturer’s installation instructions and recommendations.
2. Give particular attention to concealed products and portions of the Work that cannot otherwise be readily discerned later by direct observation.
3. Upon completion of markup, submit complete set of record Product Data to the Architect for the Owner's records.

E. Record Sample Submitted: Immediately prior to Substantial Completion, the Contractor shall meet with the Architect and the Owner's personnel at the Project Site to determine which Samples are to be transmitted to the Owner for record purposes. Comply with the Owner's instructions regarding delivery to the Owner's Sample storage area.

F. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order. Identify miscellaneous records properly and bind or file, ready for continued use and reference. Submit to the Architect for the Owner's records.

G. Maintenance Manuals: Organize operation and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual, heavy-duty, 2-inch (51-mm), 3-ring, vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Include the following types of information:

1. Emergency instructions.
2. Spare parts list.
4. Wiring diagrams.
5. Recommended “turn-around” cycles.
6. Inspection procedures.
7. Shop Drawings and Product Data.
8. Fixture lamping schedule.

H. Roughing Drawings and Operating Manuals: Plumbing, HVAC, electrical and other machinery and mechanical equipment items requiring utility service connections shall have their respective shop drawings accompanied by manufacturer's certified roughing drawings indicating accurate locations and sizes of all service utility connections.

I. Sleeve and Opening Drawings: Prior to installing service utilities or other piping, etc. through structural elements of the building, the contractor shall prepare and submit accurate dimensioned drawings to the Construction Manager for approval of the Architect and/or Structural Engineer for approval indicating the positions and sizes of all sleeves and openings required to accommodate his/her work and installation of his/her piping, equipment, etc. and all with reference to the established dimensional grid of the building. Such drawings must be submitted in sufficient time to allow proper coordination with reinforcing steel shop drawings and proper placing in the field.

J. Control Valve and Circuit Location Charts and Diagrams: The contractor shall prepare a complete set of inked or typewritten control valve and circuit location diagrams, charts, diagrams and lists under frame glass in appropriate designed equipment rooms as directed. The contractor shall also furnish one-line diagrams as well as such color-coding of piping and wiring and identifying charges as specified or required. This information is to be framed under glass and installed where directed. The Contractor shall also provide the University a second complete set of the control valve and circuit location diagrams, charts, diagrams and lists not under glass.

K. Warranties:
1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within the (10) days after completion of the applicable item of work. Leave the date of beginning of time of warranty until the Date of Final Acceptance of the building and prior to receipt of final payment.

2. Make other submittals within ten (10) days after Date of Substantial Completion, prior to final Application for Payment.

3. For items of Work for which acceptance is delayed beyond the Date of Substantial Completion, submit within (10) days after written acceptance, listing the date of acceptance as the beginning of the warranty period. Final payment will not be approved until the Owner has received all warranties.

4. Warranty periods for all items installed as part of the Work under this Contract will start at 'Final Acceptance' of the entire scope of Work on the Project.

5. Co-execute submittals when required.

6. Warranty Manual: Bind all warranties and bonds in a commercial type 81/2" X 11” three D side ring binder with durable plastic covers.
   a. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of General Contractor and equipment suppliers; and name of responsible company principal.
   b. 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 the product or work item.
   c. Transmit two (2) copies of the “Warranties Manual” to the University prior to submission of Final Application for Payment.

7. A certificate of Asbestos shall certify that no asbestos or asbestos-containing products are or have been installed as part of this project.

1.8 CLOSEOUT PROCEDURES

A. Operation and Maintenance Instructions: Arrange for each Installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. Provide instruction by manufacturer's representatives if installers are not experienced in operation and maintenance procedures. Include a detailed review of the following items:

1. Maintenance manuals.
2. Record documents.
3. Spare parts and materials.
4. Tools.
5. Lubricants.
6. Fuels.
7. Identification systems.
8. Control sequences.
9. Hazards.
10. Cleaning.
11. Warranties and bonds.
12. Maintenance agreements and similar continuing commitments.

B. As part of instruction for operating equipment, demonstrate the following procedures:

1. Startup.
2. Shutdown.
3. Emergency operations.
5. Safety procedures.
7. Effective energy utilization.

C. Allow a minimum of three (3) hours training for all of the Owners personnel who will be involved with the maintenance or operation for each piece of equipment or system that requires any type of maintenance or operation.

D. For equipment, or component parts of equipment put into service during construction and operated by the Owner, submit completed documents within ten (10) days after written acceptance and prior to receipt of final payment.

E. The contractor shall submit the as-built documents to the Owner’s Project Manager for review by the Architect/Engineer whether altered or not with a certification as to the accuracy of the information thereon at the time of contract completion and before final payment will be made to the contractor. After acceptance by the Architect/Engineer, the contractor will furnish two (2) sets of all shop and/or erection drawings used for as-built documentation.

1. All as-built drawings as submitted by the contractor shall be labeled "as-built" and dated above the title block. This information shall be checked, edited and certified by the Architect/Engineer who shall then transpose such information from the contractor's as-built drawings to the original tracings and certify that such tracing reflect "as-built" status and deliver said tracings to the University. Where shop drawings have been used by the contractor for as-built documentation the tracing provided shall include cross-reference information, which shall be included in the set of as-built drawings furnished to the University. The Contractor shall be responsible for and shall pay for the cost of erasable transparencies for its as-built drawings.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: The General Conditions require general cleaning during construction. Regular site cleaning is included in Division 1 Section "Construction Facilities and Temporary Controls."

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion.
   a. Remove labels that are not permanent labels.
   b. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are vision-deterring materials. Replace chipped or broken glass and other damaged transparent materials.
1) removal of putty stains from glass and mirrors; wash and polish inside and outside;

c. Clean exposed exterior and interior hard-suraced finishes to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition. Leave concrete floors broom clean and dust free. Vacuum carpeted surfaces.

1) removal of spots, paint and soil from resilient, glaze and unglazed masonry and ceramic flooring and wall work;

d. Vacuum as required and advisable and wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps to a mark free condition.

e. Clean the site, including landscape development areas, of rubbish, litter, and other foreign substances. Sweep paved areas broom clean; remove stains, spills, mud, stones and other foreign deposits. Rake grounds that are neither paved nor planted to a smooth, even-textured surface.

1) restoration of all landscaping, roadway and walkways to pre-existing condition; damage to trees and plantings shall be repaired in the next planting season and such shall be guaranteed for one (1) year from date of repair and/or replanting;

f. removal of marks, undesirable stains, fingerprints, other soil, dust or dirt from painted, decorated or stained woodwork, plaster or plasterboard, metal acoustic tile and equipment surfaces;

g. removal of temporary floor protections; clean, wash or otherwise treat and/or polish all finished floors as directed;

h. clean exterior and interior metal surfaces, including doors and window frames and hardware, of oil stains, dust, dirt, paint and the like; polish where applicable and leave without fingerprints or blemishes;

i. removal of all pollutants of any kind or nature deposited or remaining upon the site or upon the University's property as a result of the construction work on this project;

C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid the Project of rodents, insects, and other pests.

D. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.

E. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of lawfully.

1. Where extra materials of value remain after completion of associated Work, they become the Owner's property. Dispose of these materials as directed by the Owner.

END OF SECTION 017700
SECTION 017820 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Emergency manuals.
3. Operation manuals for systems, subsystems, and equipment.
4. Maintenance manuals for the care and maintenance of products, materials, and finishes systems and equipment.

B. Related Sections include the following:

1. Division 1 Section "Summary" for coordinating operation and maintenance manuals covering the Work of multiple contracts.
2. Division 1 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
3. Division 1 Section "Closeout Procedures" for submitting operation and maintenance manuals.
4. Division 1 Section "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
5. Divisions 2 through 16 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 SUBMITTALS

A. Initial Submittal: Submit two (2) draft copies of each manual at least fifteen (15) calendar days before requesting inspection for Substantial Completion. Include a complete operation and maintenance directory. Owner will return one copy of draft and mark whether general scope and content of manual are acceptable.

1. In lieu of hard copies, Contractor may submit digital copies in PDF format.
Final Submittal: Submit two copies of each manual in final form at least fifteen (15) calendar days before final inspection. Architect will return copy with comments within 15 days after final inspection.

1. Submit four (4) sets prior to final inspection, bound in 8-1/2” X 11” binders with durable plastic covers, table of contents, tabbed sections, and acceptable to the Owner.
2. In addition, Contractor shall submit digital copy in PDF format.
3. Submit final volumes revised, to the authorized representative of the Owner as required in these Contract Documents.

1.5 COORDINATION

A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Organization: Include a section in the directory for each of the following:

1. List of documents.
2. List of systems.
3. List of equipment.
4. Table of contents.

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 MANUALS, GENERAL

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.

B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:
1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name, address, and telephone number of Contractor.
6. Name and address of Architect.
7. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
   a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
2. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets. These manuals shall include a complete description of all systems and equipment, diagrams indicating connectors, oiling requirements, types of lubricants to be used and method of operating equipment. Included within the manuals shall be a list of names, addresses and telephone numbers of subcontractors involved in the installation and firms capable of performing services for each mechanical item.
3. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual. Internally subdivide the binders contents with permanent page dividers, logically organized as described below and with tab titling clearly printed under reinforced laminated plastic tabs.
   a. PART 1: Directory, listing names, addresses, contact persons and telephone numbers of Architects, Engineers, Contractors, Subcontractors and suppliers.
   b. PART 2: Maintenance instructions subdivided by MasterSpec Format Sections as listed within these Contract Documents. For each Section identify names, addresses, contact persons and telephone numbers of Subcontractors and suppliers. Identify the following (in addition to the items listed in "G" above):
      1) Significant design criteria
      2) List of equipment.
      3) Parts list for each component.
      4) Maintenance instructions for equipment and systems.
      5) Maintenance instructions for special finishes, including recommended cleaning
methods and materials and special precautions identifying detrimental agents.

4. **Protective Plastic Sleeves:** Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.

5. **Supplementary Text:** Prepared on 8-1/2-by-11-inch white bond paper.

6. **Drawings:** Attach reinforced, punched binder tabs on drawings and bind with text.
   a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
   b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

### 2.3 EMERGENCY MANUALS

A. **Content:** Organize manual into a separate section for each of the following:
   1. Type of emergency.
   2. Emergency instructions.
   3. Emergency procedures.

B. **Type of Emergency:** Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
   1. Fire.
   2. Flood.
   5. Power failure.
   7. System, subsystem, or equipment failure.
   8. Chemical release or spill.

C. **Emergency Instructions:** Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner’s operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. **Emergency Procedures:** Include the following, as applicable:
   1. Instructions on stopping.
   2. Shutdown instructions for each type of emergency.
   3. Operating instructions for conditions outside normal operating limits.
   4. Required sequences for electric or electronic systems.
   5. Special operating instructions and procedures.

### 2.4 OPERATION MANUALS

A. **Content:** In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
   1. System, subsystem, and equipment descriptions.
   2. Performance and design criteria if Contractor is delegated design responsibility.
   3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.5 PRODUCT MAINTENANCE MANUAL

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard printed maintenance instructions and bulletins.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training videotape, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of
required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

F. Spare Parts, Extra Materials and Maintenance Materials

1. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification sections. If there are no quantities specified then provide a minimum of five percent (5%) of:
   a. all interior finish materials (attic stock).
   b. the number of lamps and ballast needed for every light fixture.
   c. the total number of automatic light sensors.
   d. the total number of each filter type required for each Mechanical Unit requiring filters.
2. Provide 100% of all spare parts necessary to operate and maintain all equipment and building systems within the design parameters and/or as recommended by the manufacturer or supplier.
3. Deliver to Project Manager and obtain receipt prior to final payment.
4. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Special Tools

1. Provide any “special tools” (one of each type) if required as part of the operation and maintenance of any of the systems herein specified. “Special tools” are devices that are considered unique to a specified system and necessary for maintenance and operation of that system, and not normally part of the maintenance department inventory.

H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.

B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner’s operating personnel.

E. Manufacturers’ Data: Where manuals contain manufacturers’ standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers’ standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

F. Drawings: Prepare drawings supplementing manufacturers’ printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.

1. Do not use original Project Record Documents as part of operation and maintenance manuals.
2. Comply with requirements of newly prepared Record Drawings in Division 1 Section "Project Record Documents."

G. Comply with Division 1 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017820
SECTION 018200 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
   1. Demonstration of operation of systems, subsystems, and equipment.
   2. Training in operation and maintenance of systems, subsystems, and equipment.
   3. Demonstration and training videotapes.

B. Related Sections include the following, as applicable to this project:
   1. Division 1 Section "Allowances" for administrative and procedural requirements for demonstration and training allowances.
   2. Division 1 Section "Project Management and Coordination" for requirements for pre-instruction conferences.
   3. Divisions 2 through 16 Sections for specific requirements for demonstration and training for products in those Sections.

C. Allowances: Furnish demonstration and training instruction time under the Demonstration and Training Allowance as specified in Division 1 Section "Allowances."

D. Unit Price for Instruction Time: Length of instruction time will be measured by actual time spent performing demonstration and training in required location. No payment will be made for time spent assembling educational materials, setting up, or cleaning up.

1.3 SUBMITTALS

A. Instruction Program: Submit two (2) copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
   1. At completion of training, submit two (2) complete training manual(s) for Owner's use.

B. Qualification Data: For instructors.

C. Attendance Record: For each training module, submit list of participants and length of instruction time.

D. Evaluations: For each participant and for each training module, submit results and
documentation of performance-based test.

E. Demonstration and Training Videotapes: Submit two (2) copies within seven (7) days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:
   a. Name of Project.
   b. Name and address of photographer.
   c. Name of Architect.
   d. Name of Contractor.
   e. Date videotape was recorded.
   f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

2. Transcript: Prepared on 8-1/2-by-11-inch paper, punched and bound in heavy-duty, 3-ring, vinyl-covered binders. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding videotape. Include name of Project and date of videotape on each page.

1.4 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 1 Section "Quality Control Requirements," experienced in operation and maintenance procedures and training.

C. Photographer Qualifications: A professional photographer who is experienced photographing construction projects.

D. Pre-instruction Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:

   1. Inspect and discuss locations and other facilities required for instruction.
   2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
   3. Review required content of instruction.
   4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.5 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.
PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections, and as follows:

1. Motorized doors, including overhead coiling doors, overhead coiling grilles, and automatic entrance doors.
2. Equipment, including stage equipment, projection screens, loading dock equipment, waste compactors, food-service equipment, residential appliances and laboratory fume hoods, etc.
3. Fire-protection systems, including fire alarm, fire pumps and fire-extinguishing systems.
4. Intrusion detection systems.
5. Conveying systems, including elevators, wheelchair lifts, escalators and cranes.
6. Medical equipment, including medical gas equipment and piping.
7. Laboratory equipment, including laboratory air and vacuum equipment and piping.
8. Heat generation, including boilers, feed water equipment, pumps, steam distribution piping, and water distribution piping.
9. Refrigeration systems, including chillers, cooling towers, condensers, pumps and distribution piping.
10. HVAC systems, including air-handling equipment, air distribution systems and terminal equipment and devices.
11. HVAC instrumentation and controls.
12. Electrical service and distribution, including transformers, switchboards, panel boards, uninterruptible power supplies and motor controls.
13. Packaged engine generators, including transfer switches.
14. Lighting equipment and controls.
15. Communication systems, including intercommunication, surveillance, clocks and programming, voice and data and television equipment.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
   a. System, subsystem, and equipment descriptions.
   b. Performance and design criteria if Contractor is delegated design responsibility.
   c. Operating standards.
   d. Regulatory requirements.
   e. Equipment function.
   f. Operating characteristics.
   g. Limiting conditions.
   h. Performance curves.
2. Documentation: Review the following items in detail:
   a. Emergency manuals.
   b. Operations manuals.
   c. Maintenance manuals.
   d. Project Record Documents.
   e. Identification systems.
   f. Warranties and bonds.
   g. Maintenance service agreements and similar continuing commitments.
3. Emergencies: Include the following, as applicable:
   a. Instructions on meaning of warnings, trouble indications, and error messages.
   b. Instructions on stopping.
   c. Shutdown instructions for each type of emergency.
   d. Operating instructions for conditions outside of normal operating limits.
   e. Sequences for electric or electronic systems.
   f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:
   a. Startup procedures.
   b. Equipment or system break-in procedures.
   c. Routine and normal operating instructions.
   d. Regulation and control procedures.
   e. Control sequences.
   f. Safety procedures.
   g. Instructions on stopping.
   h. Normal shutdown instructions.
   i. Operating procedures for emergencies.
   j. Operating procedures for system, subsystem, or equipment failure.
   k. Seasonal and weekend operating instructions.
   l. Required sequences for electric or electronic systems.
   m. Special operating instructions and procedures.

5. Adjustments: Include the following:
   a. Alignments.
   b. Checking adjustments.
   c. Noise and vibration adjustments.
   d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:
   a. Diagnostic instructions.
   b. Test and inspection procedures.

7. Maintenance: Include the following:
   a. Inspection procedures.
   b. Types of cleaning agents to be used and methods of cleaning.
   c. List of cleaning agents and methods of cleaning detrimental to product.
   d. Procedures for routine cleaning.
   e. Procedures for preventive maintenance.
   f. Procedures for routine maintenance.
   g. Instruction on use of special tools.

8. Repairs: Include the following:
   a. Diagnosis instructions.
   b. Repair instructions.
   c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
   d. Instructions for identifying parts and components.
   e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

   A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual.

   B. Set up instructional equipment at instruction location.

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3.2 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner’s personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Architect will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
2. Owner will furnish an instructor to describe Owner’s operational philosophy.
3. Owner will furnish Contractor with names and positions of participants.

C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner with at least seven (7) calendar days’ advance notice.

D. Evaluation: At conclusion of each training module, assess and document each participant’s mastery of module by use of an oral and a demonstration performance-based test.

E. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.3 DEMONSTRATION AND TRAINING VIDEOTAPES

A. General: Engage a qualified commercial photographer to record demonstration and training videotapes. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

1. At beginning of each training module, record each chart containing learning objective and lesson outline.

B. Videotape Format: Provide high-quality VHS color videotape in full-size cassettes.

C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to show area of demonstration and training. Display continuous running time.

D. Narration: Describe scenes on videotape by dubbing audio narration off-site after videotape is recorded. Include description of items being viewed. Describe vantage point, indicating location, direction (by compass point), and elevation or story of construction.

E. Transcript: Provide a typewritten transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.

END OF SECTION 018200
SECTION 042000- STONE MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes the following:
   1. Monolithic Stone Plinth.
   2. Grout and Caulk at Existing Stone Cap.

1.3 RELATED REQUIREMENTS

A. Section 321313 –Concrete Paving
B. Section 321400 – Unit Paving

1.4 REFERENCE STANDARDS

A. American Society for Testing and Materials:
   1. ASTM A666 - Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

1.5 PERFORMANCE REQUIREMENTS

A. American Society for Testing and Materials:
   1. Design anchor attachment to stone with a factor of safety of 5:1

1.6 SUBMITTALS

A. Product Data: For each type of product indicated including, but not limited to:
   1. Cementitious materials. Include brand, type, and name of manufacturer.
   2. Joint sealants and backer rods.
   3. Anchors, clips, dowels, pins and other metal accessories.
   4. Shims and setting buttons; plastic or nylon.
   5. Steel Edging.

B. Samples for Initial Selection
   1. Monolithic Stone Boulder:
      a. Submit samples, photos, or schedule a visit to the quarry with the Landscape Architect.
2. Submit one sample for each type of attachment hardware to be used including anchors and shims.
3. Color Sealant, jointing materials and other items involving color selection. Include sample of manufacturers full range of standard colors.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs experienced stonemasons and stone fitters.

B. Source Limitations for Stone: Obtain each variety of stone, regardless of finish, from one quarry with resources to provide materials of consistent quality in appearance and physical properties.

C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.9 PROJECT CONDITIONS

A. Protection of Stone Masonry: Cover partially completed stone masonry when construction is not in progress to protect from inclement weather.

B. Stain Prevention: Immediately remove mortar and soil to prevent them from staining the exposed surfaces of stone masonry.
   1. Protect base of walls from rain-splashed mud and mortar splatter by coverings spread on the ground and over the wall surface.
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2. Protect all exposed surfaces from mortar droppings, including adjacent constructions such as exposed aggregate concrete pavement or any other adjacent surface.

C. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace stone masonry damaged by frost or freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
   1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning. Protect all exposed surfaces from mortar droppings, including adjacent constructions such as exposed aggregate concrete pavement or any other adjacent surface.

D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 60

1.10 COORDINATION

A. Advise installers of other work about specific requirements for placement of reinforcement, veneer anchors, and similar items to be built into stone masonry.

B. Verify field measurements prior to fabrication. Notify Landscape Architect of any discrepancies prior to fabrication.

1.11 WARRANTY

A. Unless stated otherwise in these Specifications, warranty shall state that all work is in accord with drawings and Specifications, as amended by any changes thereto authorized by the Landscape Architect, free from defects in materials and workmanship for a period of five (5) years from date of acceptance of the work by the Owner or failure of system to meet performance requirements. Contractor shall agree to repair or replace defective materials and workmanship during the guarantee period at no additional cost to the Owner.
   1. Defective materials and workmanship are hereby defined to include evidence of abnormal deterioration, aging, structural failure of components resulting from exposure to normal load and forces, failure of operating parts to function normally, sealant failures, deterioration or discoloration of finishes in excess of normal aging, and failure to fulfill other specified performance.

PART 2 - PRODUCTS

2.1 MONOLITHIC STONE BOULDER

A. Provide rectilinear stone blocks as shown on Drawings. Stone material to be provided by Champlain Stone, 27 Elm Street, Warrensburg, NY 12885, 518-623-2902, www.champlainstone.com, or approved equal.
   1. Color / Name: Corinthian
   2. Dimensions: as shown on Drawings.

2.2 AGGREGATE MATERIALS

A. Graded Aggregate for foundation Subbase: Sound, crushed stone or gravel complying with requirements in Section 31 20 00 "Earthwork" for subbase material.

2.3 MORTAR MATERIALS

A. Regional Materials: When available, aggregate for mortar and grout, cement, and lime shall be extracted, harvested, or recovered, as well as manufactured, within 100 miles of Project Site.

B. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

C. Hydrated Lime: ASTM C 207, Type S.

D. Aggregate for Mortar: ASTM C 144.
   1. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

E. Mortar Pigments: Natural and synthetic iron oxides. Use pigments with a record of satisfactory performance in mortar. Pigments shall contain no carbon black.

F. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

2.4 MORTAR MIXES

A. General: Do not add mixtures including coloring pigments, air-entraining agents, accelerators, retarders, water repellent agents, anti-freeze compounds, or calcium chloride, unless otherwise indicated or previously approved by Landscape Architect.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide Type N unless another type is indicated.

D. Water: Potable, clean and free from deleterious acids, alkalis, and organic matter.

E. Mixing: Combine and thoroughly mix pre-blended dry materials to water in a mechanical batch mixer; comply with ASTM C270 proportion specification and manufacturer’s instructions for mixing time and water content, unless otherwise indicated.
2.5 GROUT MATERIALS

A. Regional Materials: When available, aggregate for mortar and grout, cement, and lime shall be extracted, harvested, or recovered, as well as manufactured, within 100 miles of Project Site.

B. Preblended, Dry Grout Mix: ANSI A108.10, furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
   1. Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color. Formulate blend as required to produce color to match sample jointing color and texture as selected during Action Submittals and Mockup.
   2. Colored Mortar Pigments for Grout: Natural and synthetic iron and chromium oxides, compounded for use in mortar and grout mixes. Use only pigments that have proved, through testing and experience, to be satisfactory for use in portland cement grout.
   3. Application: Use colored aggregate mortar for exposed grout joints with the following units:
      a. Face schist.
      b. Stone capstones.

C. Standard Cement Grout: ANSI A118.6, sanded.

D. Water: Potable.

2.6 ANCHORS AND FASTENERS

   1. Sizes and configurations: As required for vertical and horizontal support of stone and applicable loads.

B. Dowels and Pins Material: Stainless steel, ASTM A 276, Type 304

2.7 MISCELLANEOUS MASONRY ACCESSORIES

A. Backer Rod for Sealant Joints: Flexible, closed cell, non-gassing, polyethylene, rope-like joint backing material of appropriate diameter for specified joint size as indicated on the Drawings to resist pressure during sealant tooling. Backer rod shall not stain or adhere to sealant materials and shall be fully compatible with sealant compounds.

B. Sealant for Joints: In compliance with manufacturer’s instructions, provide Sonneborn Sonolastic NP 2, or approved comparable product. Landscape Architect shall select color from the full range of standard colors.

C. Setting Shims: Plastic or vulcanized neoprene.

D. Setting Buttons: Resilient plastic buttons.
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2.8 FABRICATION

A. Fabricate stone to comply with sizes, shapes, and tolerances recommended by applicable stone association or, if none, by stone source, for faces, edges, beds, and backs.
   1. For granite, comply with recommendations in NBGQA's "Specifications for Architectural Granite."

B. Cut stone to produce pieces of thickness, size, and shape indicated, including details on Drawings. Dress joints (bed and vertical) straight and at right angle to face unless otherwise indicated.

C. Cut and drill slots, sinkages and holes in stone for anchors and supports.

D. Carefully inspect stone at salvage yard, supplier, quarry or fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units before shipment.
   1. Clean sawed backs of stone to remove rust stains and iron particles.

E. Thickness of Stone: Provide thickness indicated on Drawings.

F. Arrises: Remove the sharp edge from arrises to slightly blunt edge and to reduce chipping of the finished edge.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces indicated to receive stone masonry, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Examine substrate to verify that dovetail slots, inserts, reinforcement, veneer anchors, flashing, and other items installed in substrates and required for or extending into stone masonry are correctly installed.

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

D. Beginning installation means acceptance of existing conditions.

3.2 PREPARATION

A. Clean dirty or stained stone surfaces by removing soil, stains, and foreign materials before setting. Clean stone by thoroughly scrubbing with fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives.
3.3 SETTING OF STONE MASONRY, GENERAL

A. Perform necessary field cutting and trimming as stone is set. Do not trim exposed ends or faces. Cuts shall be made a joints or hidden surfaces
   1. Use power saws to cut stone that is fabricated with saw-cut surfaces. Cut lines straight and true, with edges eased slightly to prevent snipping

B. Arrange stones as indicated on Drawings.

C. Set stone to comply with requirements indicated on Drawings. Install supports, fasteners, and other attachments indicated or necessary to secure stone masonry in place. Set stone accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.

D. Provide sealant joints of widths and at locations indicated.
   1. Keep sealant joints free of mortar and other rigid materials.

3.4 CONSTRUCTION TOLERANCES

A. Variation from Plumb: For vertical lines and surfaces, do not exceed 1/4 inch in 10 feet or more.

B. Variation from Level: For joints and lines of coping, horizontal grooves, and other conspicuous lines, do not exceed 1/4 inch in 20 feet or more.

C. Measure variation from level, plumb, and position shown in plan as variation of the average plane of the face of each stone from level, plumb, or dimensioned plane.

D. Variation in Mortar-Joint Thickness: Do not vary from joint size range indicated.

E. Variation in Plane between Adjacent Rough Stones: Do not exceed one-half of tolerance specified for thickness of stone.

3.5 INSTALLATION OF ANCHORED STONE MASONRY

A. Set stone in full bed of mortar unless otherwise indicated. Build anchors into mortar joints as stone is set.

B. Provide 1-inch minimum cavity between stone masonry and backup construction unless otherwise indicated. Keep cavity free of mortar droppings and debris.
   1. Place mortar spots in cavity at veneer anchors to maintain spacing.
   2. Slope beds toward cavity to minimize mortar protrusions into cavity.
   3. Do not attempt to trowel or remove mortar fins protruding into cavity.

C. Rake out joints for sealant to depth of not less than dimension indicated on Drawings before setting mortar has hardened. Rake joints to uniform depths with square bottoms and clean sides.
3.6 ERECTION TOLERANCES

A. Variation in Line: Do not exceed 1/8 inch in 96 inches.

B. Variation in Joint Width: Do not vary joint thickness more than 1/16 inch or 1/4 inch of nominal joint width, whichever is less.

C. Variation in Surface Plane: Do not exceed 1/8 inch in 10 feet maximum from level or slope. Variation in Plane between Adjacent Units: Do not exceed 1/32-inch difference between planes of adjacent units.

3.7 ADJUSTING AND CLEANING

A. Remove and replace stone masonry of the following description:
   1. Broken, chipped, stained, or otherwise damaged stone. Stone may be repaired if methods and results are approved by Landscape Architect.
   2. Defective joints.
   3. Stone masonry not matching approved samples and mockups.
   4. Stone masonry not complying with other requirements indicated.

B. Replace in a manner that results in stone masonry matching approved samples and mockups, complying with other requirements, and showing no evidence of replacement.

C. In-Progress Cleaning: Clean stone masonry as work progresses. Remove mortar fins and smears and sealant before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean stone masonry as follows:
   1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
   2. Test cleaning methods on mockup; leave one-half of panel uncleaned for comparison purposes. Obtain Landscape Architect's approval of sample cleaning before cleaning stone masonry.
   3. Clean stone masonry by bucket and brush hand-cleaning method described in BIA Technical Note No. 20 Revised II, using job-mixed detergent solution.

3.4 PROTECTION OF FINISHED WORK

A. Do not permit construction traffic over unprotected paver surface.

3.5 CLEAN UP

A. Maintain the site in an orderly condition during the progress of work. Promptly remove debris and trash. Leave the site in a neat, orderly condition, broom clean.
SECTION 074243 – METAL SPANDREL PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes metal-faced composite wall panels.

B. Related Sections.
   1. 084313 "Aluminum-Framed Storefronts".
   2. 084413 "Glazed Aluminum Curtain Walls".

1.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design metal-faced composite wall panel assembly, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance: Provide metal-faced composite wall panel assemblies capable of withstanding the effects of the following loads and stresses within limits and under conditions indicated, based on testing according to ASTM E 330:

   1. Wind Loads: Determine loads based on the following minimum design wind pressures:

      a. Uniform pressure of [20 lbf/sq. ft. (957 Pa)] [30 lbf/sq. ft. (1436 Pa)] <Insert design wind pressure>, acting inward or outward.

   2. Deflection Limits: Metal-faced composite wall panel assemblies shall withstand wind loads with horizontal deflections no greater than [1/175 of the span at the perimeter and 1/60 of the span anywhere in the panel] <Insert deflection> of the span.

1.3 SUBMITTALS

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

B. Shop Drawings: Show fabrication and installation layouts of metal-faced composite wall panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details. Distinguish among factory-, shop-, and field-assembled work.

C. Samples: For each type of exposed finish required.

D. Product test reports.

E. Maintenance data.

F. Samples of special warranties.
1.4 QUALITY ASSURANCE

A. Panel manufacturer shall have a minimum of 25 years experience.

B. Field measurements shall be taken prior to completion of manufacturing and cutting.

C. Maximum deviation from vertical and horizontal alignment of installed panels is 1/8" (3mm) in 20' (6m) non-commutative.

1.03 - References

1. American Society of Testing Materials (ASTM)
   A. E330-84: Structural Performance of Exterior Windows, Curtain Walls and Doors under the influence of wind loads.
   B. D1781-76: Climbing Drum Peel Test for Adhesives.
   C. D3363-74: Method for Film Hardness by Pencil Test.
   D. D2794-90: Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
   E. D3359-90: Method for Measuring Adhesion by the tape test.

1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal-faced composite wall panel assemblies that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: Two years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal-faced composite wall panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 METAL-FACED LAMINATED SPANDREL PANELS

A. General: Provide factory-formed and -assembled, metal-faced composite wall panels fabricated from two metal facings bonded, using no glues or adhesives, to solid, extruded thermoplastic core; formed into profile for installation method indicated. Include attachment system components and accessories required for weathertight system.
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1. Fire-Retardant Core: Noncombustible, with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
   a. Flame-Spread Index: 25 or less.
   b. Smoke-Developed Index: 450 or less.

2. Products: Subject to compliance with requirements, provide the following:
   a. Laminated metal faced Mapes-R+ (5-Ply) panels as manufactured by Mapes Industries, Inc.
   b. Or approved equal.

2.2 PANEL FABRICATION
A. Exterior Substrate: Tempered Hardboard
B. Exterior Core: Micore
C. Smooth Mill Aluminum
D. Secondary Exterior Substrate: Tempered Hardboard
E. Interior Core: Micore
F. Interior Substrate: Tempered Hardboard
G. Tolerances - .8% of panels dimension length and width - (+/-) 1/16" thickness
H. Overall Panel Thickness - "
I. Glazing Leg Thickness - "
J. R-Value - 5.56
K. U-Value - 0.18

2.3 FINISH
A. Exterior – Clear Anodized Class I
B. Interior – Standard Kynar.

2.4 ACCESSORIES
A. Recommended for use as an infill panel component in window and curtain wall systems. Related material to complete installation as recommended by the manufacturer.
B. Seals against moisture intrusion as recommended by the manufacturer. Polyurethane and silicone based sealant with a 20 year life are recommended.
C. Applied stops at the perimeter of the interior side of the spandrel panel. Finish to be clear anodized aluminum.
PART 3 - EXECUTION

3.1 INSTALLATION
   A. Panel surfaces shall be free from defects prior to installation.

3.2 EXECUTION
   A. Erect panels plumb, level and true.
   B. Glaze panels securely and in accordance with approved shop drawings and manufacturers instructions to allow for necessary thermal movement and structural support.
   C. Do not install panels that are observed to be defective including warped, bowed, dented, scratched and delaminating components.
   D. Weatherseal all joints as required using methods and materials as previously specified.
   E. Separate dissimilar metals using gasketed fasteners and blocking to eliminate the possibility of electrolytic reaction.
   F. Apply stops to interior perimeter of the new panel.

3.3 CLEANING
   A. Remove temporary protective coverings and strippable films, if any, as metal-faced composite wall panels are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of metal-faced composite wall panel installation, clean finished surfaces as recommended by panel manufacturer. Maintain in a clean condition during construction.
   B. After metal-faced composite wall panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

END OF SECTION 074243
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Manufactured reglets and counterflashing.
   2. Formed wall sheet metal fabrications.

1.2 SUBMITTALS

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

B. Shop Drawings: Show installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.

   1. Include details for forming, joining, supporting, and securing sheet metal flashing and trim, including pattern of seams, termination points, fixed points, expansion joints, expansion-joint covers, edge conditions, special conditions, and connections to adjoining work.

C. Samples: For each exposed product and for each finish specified.

D. Maintenance data.

E. Warranty: Sample of special warranty.

1.3 QUALITY ASSURANCE

A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.

B. Copper Sheet Metal Standard: Comply with CDA's "Copper in Architecture Handbook." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

C. Preinstallation Conference: Conduct conference at Project site.

1.4 WARRANTY

A. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within 10 years from date of Substantial Completion.
PART 2 - PRODUCTS

2.1 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.

B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required.

1. Clear Anodic Finish, Coil Coated: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

2.2 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils (0.76 to 1.0 mm) thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.

2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F (29 deg C).

2.3 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
   a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating.
   b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
   c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.

C. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
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D. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

2.4 REGLETS

A. Reglets: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated [with factory-mitered and -welded corners and junctions] [with interlocking counterflashing on exterior face, of same metal as reglet].

1. Material: Aluminum, 0.024 inch (0.61 mm) thick.
   a. Finish: Two-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat.

2. Color: To match window system

2.5 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.

1. Obtain field measurements for accurate fit before shop fabrication.
2. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
3. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.

B. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.

C. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.

D. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

E. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.
2.6 WALL SHEET METAL FABRICATIONS

A. Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend 4 inches (100 mm) beyond wall openings. Form head and sill flashing with 2-inch- (50-mm-) high, end dams. Fabricate from the following materials:
   1. Aluminum: 0.032 inch (0.81 mm) thick.

B. Column Cover: Fabricate from the following materials:
   1. Aluminum: 0.080 inch thick.

PART 3 - EXECUTION

3.1 UNDERLAYMENT INSTALLATION

A. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps with roller. Cover underlayment within 14 days.

3.2 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement so that completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
   1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
   2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
   3. Space cleats not more than 12 inches (300 mm) apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
   4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
   5. Install sealant tape where indicated.
   6. Torch cutting of sheet metal flashing and trim is not permitted.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.
   1. Coat back side of uncoated aluminum sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.

D. Seal joints as shown and as required for watertight construction.

3.3 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder and sealants.

C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.

END OF SECTION 076200
SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Latex joint sealants.

1.2 PRECONSTRUCTION TESTING

A. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers eight samples of materials that will contact or affect joint sealants. Use ASTM C 1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.


1.3 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples: For each kind and color of joint sealant required.

C. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.

D. Product test reports.

E. Preconstruction compatibility and adhesion test reports.

F. Preconstruction field-adhesion test reports.

G. Field-adhesion test reports.

H. Warranties.
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1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

B. Preinstallation Conference: Conduct conference at Project site.

1.5 WARRANTY

A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Part 59, Subpart D (EPA Method 24):

1. Architectural Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

B. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

1. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.

C. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

D. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

2.2 SILICONE JOINT SEALANTS

A. Neutral Cure Silicone Joint Sealant ASTM C 920.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Pecora Corporation.
   b. Sika Corporation; Construction Products Division.
   c. Tremco Incorporated.
   d. Or approved equal

2. Type: Single component (S).
3. Grade: nonsag (NS).
4. Class: 100/50.
5. Uses Related to Exposure: Nontraffic (NT).

2.3 LATEX JOINT SEALANTS

A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. BASF Building Systems.
   b. Pecora Corporation.
   c. Tremco Incorporated.
   d. Or approved equal.

2.4 JOINT SEALANT BACKING

A. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

2.5 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.
3.1 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.
   1. Remove laitance and form-release agents from concrete.
   2. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.2 INSTALLATION

A. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

B. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
   1. Do not leave gaps between ends of sealant backings.
   2. Do not stretch, twist, puncture, or tear sealant backings.
   3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
   1. Place sealants so they directly contact and fully wet joint substrates.
   2. Completely fill recesses in each joint configuration.
   3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form
smoothing, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C1193, unless otherwise indicated.

F. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.3 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:
   a. Perform 10 tests for the first 1000 feet (300 m) of joint length for each kind of sealant and joint substrate.
   b. Perform 1 test for each 1000 feet (300 m) of joint length thereafter or 1 test per each floor per elevation.


B. Evaluation of Field-Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.4 JOINT-SEALANT SCHEDULE


1. Joint Locations:
   a. Joints in exterior stucco systems.
   b. Perimeter joints between materials listed above and frames of doors, windows, and louvers.
   c. Control and expansion joints.
   d. Other joints as indicated.

3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

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1. Joint Locations:
   a. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
   b. Other joints as indicated.


3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 079200
1.4 Related Documents
   B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.5 Summary
   B. Related Sections.
      1. 079200 “Joint Sealants”.
      2. 084313 "Aluminum-Framed Storefronts".
      3. 084413 "Glazed Aluminum Curtain Walls".
      4. 087100 "Hardware".
      5. 088000 "Glazing".

1.6 Definitions
   B. Definitions: For fenestration industry standard terminology and definitions refer to American Architectural Manufactures Association (AAMA) – AAMA Glossary (AAMA AG).

1.7 Performance Requirements
   A. General Performance: Aluminum-framed entrance system shall withstand the effects of the following performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.

   B. Delegated Design: Design aluminum framed entrances including comprehensive engineering analysis by a qualified professional engineer licensed in the state of NJ, using performance requirements and design criteria indicated.

   C. Aluminum-Framed Entrance Performance Requirements.
      1. Wind loads: As required by the 2015 International Building Code NJ.
      2. Uniform Load: A static air design load of 85 psf, (65 psf for laminated infill) shall be applied in the positive and negative direction in accordance with Florida Building Code TAS202 and ASTM E 330. There shall be no deflection in excess of L/180 of the span of any framing member. At a structural test load equal to 1.5 times the specified design load, no glass breakage shall occur.
      3. Forced Entry: Tested in accordance with AAMA 1304.

1.8 Submittals
   B. Product Data: Include construction details, material descriptions, and fabrication methods, dimensions of individual components and profiles, hardware, finishes, and installation instructions for each type of aluminum-framed entrance door indicated.
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C. Shop Drawings: Include plans, elevations, sections, details, hardware, and attachments to other work, operational clearances and installation details. Signed and sealed by a professional engineer licensed in the state of NJ.

D. Samples for Initial Selection: For units with factory-applied color finishes including samples of hardware and accessories involving color selection.

E. Samples for Verification: For aluminum-framed entrance door and components required.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for each type of aluminum-framed entrance doors.

G. Fabrication Sample: Corner sample consisting of a door stile and rail, of full-size components and showing details of the following.
   1. Joinery, including welds.
   2. Glazing.

H. Other Action Submittals.
   1. Entrance Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

1.9 Quality Assurance

B. Installer Qualifications: An installer which has had successful experience with installation of the same or similar units required for the project and other projects of similar size and scope.

C. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum-framed entrance doors and storefronts that meet or exceed performance requirements indicated and of documenting this performance by inclusion of test reports, and calculations.

D. Source Limitations: Obtain aluminum-framed entrance doors through one source from a single manufacturer.

E. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum-framed entrance doors and are based on the specific system indicated. Refer to Division 01 Section “Product Requirements”. Do not modify size and dimensional requirements.
   1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect’s approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

F. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Build mockup for type(s) of aluminum-framed entrance door(s) indicated, in location(s) shown on Drawings.

G. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section “Project Management and Coordination”. 

1.10 Project Conditions
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B. Field Measurements: Verify actual dimensions of aluminum-framed entrance door openings by field measurements before fabrication and indicate field measurements on Shop Drawings.

1.11 Warranty
B. Manufacturer’s Warranty: Submit, for Owner’s acceptance, manufacturer’s standard warranty.
   1. Warranty Period: Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by manufacturer.
C. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes do not comply with requirements or that fail in materials or workmanship within specified warranty period. Warranty does not include normal weathering.
   2. Warranty Period: Ten (10) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by manufacturer.

PART 2 - PRODUCTS

2.4 Manufacturers
A. Basis-of-Design Product:
   1. Kawneer Company Inc.
   2. 500 Heavy Wall Door
      The door stile and rail face dimensions of the entrance door will be as follows:
      Vertical Stile  Top Rail  Bottom Rail
      5"       5"   10"
   3. Major portions of the door members to be 0.188" nominal in thickness and glazing molding to be 0.05" thick.
   4. Glazing gaskets shall be either EPDM elastomeric extrusions or a thermoplastic elastomer.
   5. Provide adjustable glass jacks to help center the glass in the door opening.
B. Substitutions: Refer to Substitutions Section for procedures and submission requirements.

2.5 Materials
B. Aluminum Extrusions: Alloy and temper recommended by aluminum-framed entrance door manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.090" wall thickness at any location for the main frame and door leaf members.
C. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum-framed entrance door members, trim hardware, anchors, and other components.
D. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
E. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or
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iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

1. Weather Seals: Provide weather stripping with integral barrier fin or fins of semi-rigid, polypropylene sheet or polypropylene-coated material. Comply with AAMA 701/702.

2.6 Storefront Framing System
A. Storefront Entrance Framing per specification section 084113.
B. Non-Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials. Where exposed shall be stainless steel.
D. Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.
E. Packing, Shipping, Handling and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
F. Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle aluminum-framed entrance door material and components to avoid damage. Protect aluminum-framed entrance door material against damage from elements, construction activities, and other hazards before, during and after aluminum-framed entrance door installation.

2.7 Glazing
A. Glazing: As specified in Division 08 Section “Glazing”.

2.8 Hardware
A. General: As specified in Division 08 Section “Door Hardware”.

2.9 Fabrication
B. Fabricate aluminum-framed entrance doors in sizes indicated. Include a complete system for assembling components and anchoring doors.
C. Fabricate aluminum-framed entrance doors that are reglazable without dismantling perimeter framing.
   1. Door corner construction shall consist of mechanical clip fastening, SIGMA deep penetration plug welds and 1-1/8” (29 mm) long fillet welds inside and outside of all four corners. Glazing stops shall be hook-in type with EPDM glazing gaskets reinforced with non-stretchable cord.
   2. Accurately fit and secure joints and corners. Make joints hairline in appearance.
   3. Prepare components with internal reinforcement for door hardware.
   4. Arrange fasteners and attachments to conceal from view.
D. Weather-stripping: Provide weather-stripping locked into extruded grooves in door panels or frames as indicated on manufacturer’s drawings and details.
2.10 Aluminum Finishes

B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

C. Factory Finishing.


PART 3 - EXECUTION

3.4 Examination

B. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated installation.

1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.

2. Wood Frame Walls: Dry, clean, sound, well nailed, free of voids, and without offsets at joints. Ensure that nail heads are driven flush with surfaces in opening and within 3 inches (76.2 mm) of opening.

3. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.

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

3.5 Installation

B. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing aluminum-framed entrance doors, hardware, accessories, and other components.

C. Install aluminum-framed entrance doors level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.

D. Set sill threshold in bed of sealant, as indicated, for weather tight construction.

E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.6 Field Quality Control

B. Manufacturer's Field Services: Upon Owner’s written request, provide periodic site visit by manufacturer’s field service representative.

3.7 Adjusting, Cleaning, and Protection

B. Clean aluminum surfaces immediately after installing aluminum-framed entrances. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
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C. Clean glass immediately after installation. Comply with glass manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.

D. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION 084113
SECTION 084313 - ALUMINUM-FRAMED STOREFRONTS

PART 1 - GENERAL

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 Summary

A. Section Includes: Kawneer Architectural Aluminum Storefront Systems, including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of storefront units.

B. Related Sections:
   1. 079200 “Joint Sealants”
   2. 084113.1 “Aluminum-Framed Entrances and Storefronts”
   3. 084413 “Glazed Aluminum Curtain Walls”
   4. 088000 “Glazing”
   5. 107113 “Exterior Sun Control Devices”

1.3 Definitions

A. Definitions: For fenestration industry standard terminology and definitions refer to American Architectural Manufacturers Association (AAMA) – AAMA Glossary (AAMA AG).

1.4 Performance Requirements

A. Delegated Design: Design aluminum framed storefronts, including comprehensive engineering analysis by a qualified professional engineer licensed in the state of NJ, using performance requirements and design criteria indicated.

B. Storefront System Performance Requirements:

1. Wind loads: As required by the 2015 International Building Code NJ.
2. Air Leakage: The test specimen shall be tested in accordance with ASTM E 283. Air Leakage rate shall not exceed 0.06 cfm/ft² at a static air pressure differential of 6.2 psf with interior seal, or, rate shall not exceed 0.06 cfm/ft² at a static air pressure differential of 1.6 psf without interior seal. CSA A440 Fixed Rating.
3. Water Resistance: The test specimen shall be tested in accordance with ASTM E 331. There shall be no leakage at a minimum static air pressure differential of 8 psf as defined in AAMA 501.
4. Uniform Load: A static air design load of 35 psf shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any framing member. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.
5. Seismic: When tested to AAMA 501.4, system must meet design displacement of 0.010 x the story height and ultimate displacement of 1.5 x the design displacement.
6. Thermal Movements: Allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures:
   a. Temperature Change (Range): 0 deg F; 180 deg F.
   b. Test Interior Ambient-Air Temperature: 75 deg F.
   c. Test Performance: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5 for a minimum 3 cycles.

7. Thermal Transmittance (U-factor): When tested to AAMA Specification 1503, the thermal transmittance (U-factor) shall not be more than:
   a. Glass to Center – 0.42 (low-e) per NFRC 100.

8. Condensation Resistance (CRF): When tested to AAMA Specification 1503, the condensation resistance factor shall not be less than:
   a. Glass to Center – $62_{\text{frame}}$ and $68_{\text{glass}}$ (low-e)

9. Outdoor-Indoor Transmission Class (OITC): When tested to AAMA Specification 1801 and in accordance with ASTM E1425 and ASTM E90, the STC and OITC Rating shall not be less than:
   a. Glass to Center – 37 (STC)30 (OITC).

1.5 Submittals

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, hardware, finishes, and installation instructions for each type of aluminum-framed storefront system indicated.

A. Shop Drawings: Include plans, elevations, sections, details, hardware, and attachments to other work, operational clearances and installation details. Signed and sealed by a professional engineer licensed in the state of NJ.

B. Samples for Initial Selection: For units with factory-applied color finishes including samples of hardware and accessories involving color selection.

C. Samples for Verification: For aluminum-framed storefront system and components required.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for each type of aluminum-framed storefront.

E. Fabrication Sample: Of each vertical-to-horizontal intersection of aluminum-framed systems, made from 12" lengths of full-size components and showing details of the following:
   1. Joinery.
   2. Anchorage.
   5. Flashing and drainage.

F. Other Action Submittals:
   1. Entrance Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

1.6 Quality Assurance

A. Installer Qualifications: An installer which has had successful experience with installation of the same or similar units required for the project and other projects of similar size and scope.
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B. Manufacturer Qualifications: A manufacturer capable of providing aluminum-framed storefront system that meet or exceed performance requirements indicated and of documenting this performance by inclusion of test reports, and calculations.

C. Source Limitations: Obtain aluminum-framed storefront system through one source from a single manufacturer.

D. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum-framed storefront system and are based on the specific system indicated. Refer to Division 01 Section “Product Requirements”. Do not modify size and dimensional requirements.
1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect’s approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Build mockup for one type of storefront elevation as selected by architect in field.

F. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section “Project Management and Coordination”.


H. Structural-Sealant Joints: Design reviewed and approved by structural-sealant manufacturer.

1.7 Project Conditions
A. Field Measurements: Verify actual dimensions of aluminum-framed storefront openings by field measurements before fabrication and indicate field measurements on Shop Drawings.

1.8 Warranty
A. Manufacturer’s Warranty: Submit, for Owner’s acceptance, manufacturer’s standard warranty.
1. Warranty Period: Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by manufacturer.

B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes do not comply with requirements or that fail in materials or workmanship within specified warranty period. Warranty does not include normal weathering.
2. Warranty Period: Ten (10) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by manufacturer.

PART 2 - PRODUCTS

2.1 Manufacturers
A. Basis-of-Design Product:
1. Kawneer Company Inc.
2. Trifab 451T (Thermal) Framing System
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3. System Dimensions: 2" x 4-1/2"
4. Glass: Center
5. Or approved equal.

B. Substitutions: Refer to Substitutions Section for procedures and submission requirements

2.2 Materials

A. Aluminum Extrusions: Alloy and temper recommended by aluminum storefront manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.070" (1.8 mm) wall thickness at any location for the main frame and complying with ASTM B 221: 6063-T6 alloy and temper.

B. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum framing members, trim hardware, anchors, and other components.

C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

E. Sealant: For sealants required within fabricated storefront system, provide permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.

F. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standards and Data.

2.3 Storefront Framing System

A. Thermal Barrier:
   1. Thermal Break with a 1/4" separation consisting of a two-part chemically curing, high-density polyurethane, which is mechanically and adhesively joined to aluminum storefront sections.
      a. Thermal Break shall be designed in accordance with AAMA TIR-A8 and tested in accordance with AAMA 505.

B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials. Where exposes shall be stainless steel.

D. Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action

E. Packing, Shipping, Handling and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

F. Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle storefront material and components to avoid damage. Protect storefront material against damage from elements, construction activities, and other hazards before, during and after storefront installation.
2.4 Glazing Systems
A. Glazing: As specified in Division 08 Section “Glazing”.
B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, extruded EPDM rubber.
C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.
D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.
E. Glazing Sealants: For structural-sealant-glazed systems, as recommended by manufacturer for joint type, and as follows:
   1. Weatherseal Sealant: ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; single-component neutral-curing formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and aluminum-framed-system manufacturers for this use.
      a. Color: To be selected from manufacturers full range of colors.

2.5 Entrance Door Systems
A. Entrance Doors: As specified in Division 084113.1 Section “Aluminum-Framed Entrances”.
B. Entrance Door Hardware: As specified in Division 084113 Section “Door Hardware”.

2.6 Accessory Materials
A. An aluminum sunshade that is anchored directly to the vertical mullions. Outriggers shall be painted. Louvers and fascia shall be painted or anodized, as specified in Division 107113 “Exterior Sun Control Devices”.
B. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 07 Section “Joint Sealants”.
C. Versoleil SunShade or approved equal – Outrigger/Single Blade System: An aluminum sunshade (consisting of outriggers, louvers, and fascia that is anchored directly to the storefront mullions. All components shall be painted to match window system.

2.7 Fabrication
A. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
   1. Profiles that are sharp, straight, and free of defects or deformations.
   2. Accurately fit joints; make joints flush, hairline and weatherproof.
   3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
   4. Physical and thermal isolation of glazing from framing members.
   5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
   7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
B. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
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C. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.

D. Storefront Framing: Fabricate components for assembly using manufacturer’s standard installation instructions.

E. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.8 Aluminum Finishes

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Factory Finishing:

2.9 Examination

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weather tight framed aluminum storefront system installation.
   1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
   2. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
   3. Proceed with installation only after unsatisfactory conditions have been corrected.

2.10 Installation

A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing aluminum-framed storefront system, accessories, and other components.

B. Install aluminum-framed storefront system level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.

C. Set sill members in bed of sealant or with gaskets, as indicated, for weather tight construction.

D. Install aluminum-framed storefront system and components to drain condensation, water penetrating joints, and moisture migrating within aluminum-framed storefront to the exterior.

E. Separate aluminum and other corrodeable surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

2.11 Field Quality Control

A. Field Tests: Architect shall select storefront units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured. Allow for testing of 25% of all storefront. Conduct tests for air infiltration and water penetration with manufacturer's representative present. Tests not meeting specified performance requirements and units having deficiencies shall be corrected as part of the contract amount.
1. Testing: Testing shall be performed by a qualified independent testing agency as part of the construction contract. Testing Standard per AAMA 503, including reference to ASTM E 783 for Air Infiltration Test and ASTM E 1105 Water Infiltration Test.
   a. Air Infiltration Tests: Conduct tests in accordance with ASTM E 783. Allowable air infiltration shall not exceed 1.5 times the amount indicated in the performance requirements or 0.09 cfm/ft², whichever is greater.
   b. Water Infiltration Tests: Conduct tests in accordance with ASTM E 1105. No uncontrolled water leakage is permitted when tested at a static test pressure of two-thirds the specified water penetration pressure but not less than 6.2 psf.

B. Manufacturer's Field Services: Upon Owner’s written request, provide periodic site visit by manufacturer’s field service representative.

2.12 Adjusting, Cleaning, and Protection

A. Clean aluminum surfaces immediately after installing aluminum-framed storefronts. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

B. Clean glass immediately after installation. Comply with glass manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.

C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION 084113
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PART 1 - GENERAL

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 Summary

A. Section Includes: Kawneer Architectural Aluminum Curtain Wall Systems, including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of curtain wall framing.
   1. Field assembled framed stick built glazed aluminum curtain walls.
   2. Anchors, shims, fasteners, inserts, splices accessories and supports.

B. Related Sections.
   1. 079200 “Joint Sealants”.
   2. 084113 “Aluminum-Framed Entrances and Storefronts”.
   3. 084313 “Aluminum-Framed Storefronts”.
   4. 088000 “Glazing”.
   5. 107113 “Exterior Sun Control Devices”.

1.3 Definitions

A. Definitions: For fenestration industry standard terminology and definitions refer to American Architectural Manufactures Association (AAMA) – AAMA Glossary (AAMA AG).

1.4 Performance Requirements

A. General Performance: Comply with performance requirements specified, as determined by testing of glazed aluminum curtain walls representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
   1. Glazed aluminum curtain walls shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads. Failure also includes the following.
      a. Thermal stresses transferring to building structure.
      b. Glass breakage.
      c. Loosening or weakening of fasteners, attachments, and other components.
      d. Failure of operating units.

B. Delegated Design: Design glazed aluminum curtain walls and required associated structural support, including comprehensive engineering analysis by a qualified professional engineer licensed in the state of NJ, using performance requirements and design criteria indicated.

C. Wind loads: Wind loads: As required by the 2015 International Building Code NJ.

D. Air Infiltration: The test specimen shall be tested in accordance with ASTM E 283. Air infiltration rate shall not exceed 0.06 cfm/ft² (0.3 l/s · m²) at a static air pressure differential of 6.2 psf (300 Pa).

E. Water Resistance, (static): The test specimen shall be tested in accordance with ASTM E 331. There shall be no leakage at a static air pressure differential of 12 psf (575 Pa) as defined in AAMA 501.
F. Water Resistance, (dynamic): The test specimen shall be tested in accordance with AAMA 501.1. There shall be no leakage at an air pressure differential of 12 psf (575 Pa) as defined in AAMA 501.

G. Uniform Load: A static air design load of 40 psf (1915 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any framing member at design load. At structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.

H. Seismic: When tested to AAMA 501.4, system must meet design displacement (elastic) of 0.010 x the story height and ultimate displacement (inelastic) of 1.5 x the design displacement.

I. Thermal Transmittance (U-factor): When tested to AAMA Specification 1503, the thermal transmittance (U-factor) shall not be more than: 0.42 (low-e) per NFRC 100.

J. Condensation Resistance (CRF): When tested to AAMA Specification 1503, the condensation resistance factor shall not be less than 71 frame and 71 glass (HP glass).

K. Sound Transmission Loss: When tested to ASTM E90 and ASTM E1425, the Sound Transmission Class (STC) and Outdoor/Indoor Transmission Class (OITC) shall not be less than: STC 31 or OITC 26 based upon 1" (25.4) insulating glass (1/4", 1/2" AS, 1/4").

1.5 Submittals

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For glazed aluminum curtain walls. Include plans, elevations, sections, full-size details, and attachments to other work. Signed and sealed by a professional engineer licensed in the state of NJ.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified pre-construction testing agency, for glazed aluminum curtain walls, indicating compliance with performance requirements.

F. Fabrication Sample: Of each vertical-to-horizontal intersection of aluminum-framed curtain wall systems, made from 12" (304.8 mm) lengths of full-size components and showing details of the following:
   1. Joinery.
   2. Glazing.

1.6 Quality Assurance

A. Installer Qualifications: Installer who has had successful experience with installation of the same or similar systems required for the project and other projects of similar size and scope.

B. Manufacturer Qualifications: A manufacturer capable of fabricating glazed aluminum curtain walls that meet or exceed performance requirements.

C. Source Limitations: Obtain aluminum curtain wall system through one source from a single manufacturer.
D. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If revisions are proposed, submit comprehensive explanatory data to Architect for review.

E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Build mockups for type(s) of curtain wall elevation(s) indicated, in location(s) shown on Drawings.

F. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section “Project Management and Coordination”.

1.7 Project Conditions
A. Field Measurements: Verify actual locations of structural supports for glazed aluminum curtain walls by field measurements before fabrication and indicate measurements on Shop Drawings.

1.8 Warranty
A. Manufacturer’s Warranty: Submit, for Owner’s acceptance, manufacturer’s standard warranty.
1. Warranty Period: Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by manufacturer.

B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes do not comply with requirements or that fail in materials or workmanship within specified warranty period. Warranty does not include normal weathering.
2. Warranty Period: Ten (10) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by manufacturer.

PART 2 - PRODUCTS

2.1 Manufacturers
A. Basis-of-Design Product.
1. Kawneer Company Inc..
   a. 1600 Wall System™1 Curtain Wall – 2-1/2" (63.5), outside glazed pressure plate format.
      1) System depth: 6" (152.4) or 7-1/2" (190.5) for 1" (25.4) insulating glazing and 1/4" (6.3) monolithic glazing.
2. Or approved equal.
B. Substitutions: Refer to Substitutions Section for procedures and submission requirements.

2.2 Materials
A. Aluminum Extrusions: Alloy and temper recommended by glazed aluminum curtain wall manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.070" (1.78) wall thickness at any location for the main frame and complying with ASTM B 221: 6063-T6 alloy and temper.

B. Aluminum sheet alloy: Shall meet the requirements of ASTM B209.

C. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum window members, trim hardware, anchors, and other components.

D. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

E. Pressure Plate: Pressure plate shall be aluminum and fastened to the mullion with stainless steel screws.

F. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

G. Sealant: For sealants required within fabricated curtain wall system, provide permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.

H. Thermal Barrier: Thermal separator shall be extruded of a silicone compatible elastomer that provides a minimum 1/4" (6.3) separation.

I. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of glazed curtain wall members are nominal and in compliance with AA Aluminum Standards and Data.

2.3 Curtain Wall Framing
A. Framing Members: Manufacturer's standard extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.

B. Glass: 1/4" (6.3), 9/16" (14.3), 5/8" (15.9) monolithic glass or 1" (25.4), 1-5/16" (33.3) insulating glass option.

C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

D. Framing Sealants: Shall be suitable for glazed aluminum curtain wall as recommended by sealant manufacturer.

E. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials. Where exposed shall be stainless steel.
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F. Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.

G. Packing, Shipping, Handling and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

H. Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle curtain wall material and components to avoid damage. Protect curtain wall material against damage from elements, construction activities, and other hazards before, during and after installation.

2.4 Glazing
A. Glazing: Comply with Division 08 Section “Glazing”. Following glazing options are available.

B. Glazing Gaskets: Gaskets to meet the requirements of ASTM C864.

C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.

D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.

E. Glazing Sealants: As recommended by manufacturer for joint type.

2.5 Operable Units
A. Doors: Comply with Division 08 Section “Aluminum-Framed Entrances and Storefronts”.

2.6 Accessory Materials
A. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil (0.762 mm) thickness per coat.

2.7 Fabrication
A. Form or extrude aluminum shapes before finishing.

B. Fabricate components that, when assembled, have the following characteristics.
   1. Profiles that are sharp, straight, and free of defects or deformations.
   2. Accurately fitted joints.
   3. Physical and thermal isolation of glazing from framing members.
   4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
   5. Provisions for field replacement of glazing from exterior.
   6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
   7. Internal weeping system or other means to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.

C. Curtain Wall Framing: Fabricate components for assembly using shear block system following manufacturer's standard installation instructions.

D. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.8 Aluminum Finishes
A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
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B. Factory Finishing.
      Class I Clear Anodic.

PART 3 - EXECUTION

3.1 Examination
   A. Examine areas, with Installer present, for compliance with requirements for installation tolerances
      and other conditions affecting performance of the Work.
   B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Installation
   A. General: Install curtain wall systems plumb, level, and true to line, without warp or rack of
      frames with manufacturer’s prescribed tolerances and installation instructions. Provide support
      and anchor in place.
      1. Dissimilar Materials: Provide separation of aluminum materials from sources of corrosion or
         electrolytic action contact points.
      2. Glazing: Glass shall be outside glazed and held in place with extruded aluminum pressure
         plates anchored to the mullion using stainless steel fasteners spaced no greater than 9” (228.6)
         on center.
      3. Water Drainage: Each light of glass shall be compartmentalized using joint plugs and silicone
         sealant to divert water to the horizontal weep locations. Weep holes shall be located in the
         horizontal pressure plates and covers to divert water to the exterior of the building.
   B. Related Products Installation Requirements.
      1. Sealants (Perimeter): Refer to Joint Treatment (Sealants) Section.
      2. Glass: Refer to Glass and Glazing Section.

3.3 Field Quality Control
   A. Field Tests: Architect shall select curtain wall units to be tested as soon as a representative por-
      tion of the project has been installed, glazed, perimeter caulked and cured. Conduct tests for air
      infiltration and water penetration with manufacturer’s representative present. Tests not meeting
      specified performance requirements and units having deficiencies shall be corrected as part of the
      contract amount.
      1. Testing: Testing shall be performed per AAMA 503 by a qualified independent testing agen-
         cy as part of the construction contract. Refer to Testing Section for payment of testing and
         testing requirements.
         a. Air Infiltration Tests: Conduct tests in accordance with ASTM E 783. Allowable air infil-
            tration shall not exceed 1.5 times the amount indicated in the performance requirements
            or 0.09 cfm/ft², which ever is greater.
         b. Water Infiltration Tests: Conduct tests in accordance with ASTM E 1105. No uncon-
            trolled water leakage is permitted when tested at a static test pressure of two-thirds the
            specified water penetration pressure but not less than 10 psf.
   B. Manufacturer’s Field Services: Upon Owner’s written request, provide periodic site visit by man-
      ufacturer’s field service representative.

3.4 Adjusting, Cleaning and Protection
A. Protection: Protect installed product’s finish surfaces from damage during construction. Protect aluminum curtain wall system from damage from grinding and polishing compounds, plaster, lime, acid, cement, or other harmful contaminants.

B. Cleaning: Repair or replace damaged installed products. Clean installed products in accordance with manufacturer’s instructions prior to owner’s acceptance. Remove construction debris from project site and legally dispose of debris.

C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION 084413
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

   1. Mechanical and electrified door hardware for:
      a. Swinging doors.

B. Exclusions: Unless specifically listed in hardware sets, hardware is not specified in this section for:

   1. Windows
   2. Cabinets (casework), including locks in cabinets
   3. Signage
   4. Toilet accessories
   5. Overhead doors

C. Related Sections:

   1. Division 01 Section “Alternates” for alternates affecting this section.
   2. Division 07 Section “Joint Sealants” for sealant requirements applicable to threshold installation specified in this section.

1.3 REFERENCES

A. Fire/Life Safety

   1. NFPA - National Fire Protection Association
      a. NFPA 70 – National Electric Code
      b. NFPA 80 - Standard for Fire Doors and Fire Windows
      d. NFPA 105 - Smoke and Draft Control Door Assemblies


B. UL - Underwriters Laboratories

   1. UL 10B - Fire Test of Door Assemblies
   2. UL 10C - Positive Pressure Test of Fire Door Assemblies
   3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

C. Accessibility

1. ADA - Americans with Disabilities Act.

D. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Key Systems and Nomenclature

E. ANSI - American National Standards Institute

1. ANSI/BHMA A156.1 - A156.29, and ANSI A156.31 - Standards for Hardware and Specialties

1.4 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 requirements.
2. Highlight, encircle, or otherwise specifically identify on submittals deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.
3. Prior to forwarding submittal, comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, “EXAMINATION” article, herein.

B. Action Submittals:

1. Product Data: Product data including manufacturers’ technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
   a. Wiring Diagrams: For power, signal, and control wiring and including:
      1) Details of interface of electrified door hardware and building safety and security systems.
      2) Schematic diagram of systems that interface with electrified door hardware.
      3) Point-to-point wiring.
      4) Risers.
3. Samples for Verification: If requested by Architect, submit production sample or sample installations of each type of exposed hardware unit in finish indicated, and tagged with full description for coordination with schedule.
   a. Samples will be returned to supplier in like-new condition. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.
4. Door Hardware Schedule: Submit schedule with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening, include:

   a. Door Index; include door number, heading number, and Architects hardware set number.
   b. Opening Lock Function Spreadsheet: List locking device and function for each opening.
   c. Type, style, function, size, and finish of each hardware item.
   d. Name and manufacturer of each item.
   e. Fastenings and other pertinent information.
   f. Location of each hardware set cross-referenced to indications on Drawings.
   g. Explanation of all abbreviations, symbols, and codes contained in schedule.
   h. Mounting locations for hardware.
   i. Door and frame sizes and materials.
   j. Name and phone number for local manufacturer's representative for each product.

5. Key Schedule:

   a. After Keying Conference, provide keying schedule listing levels of keying as well as explanation of key system's function, key symbols used and door numbers controlled.
   b. Use ANSI A156.28 “Recommended Practices for Keying Systems” as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
   c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
   d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
   e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion.
      1) Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
   f. Prepare key schedule by or under supervision of supplier, detailing Owner’s final keying instructions for locks.

6. Templates: After final approval of hardware schedule, provide templates for doors, frames and other work specified to be factory prepared for door hardware installation.

C. Informational Submittals:

1. Qualification Data: For Supplier, Installer and Architectural Hardware Consultant.
2. Product Certificates for electrified door hardware, signed by manufacturer:
   a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
3. Certificates of Compliance:
   a. Certificates of compliance for fire-rated hardware and installation instructions if requested by Architect or Authority Having Jurisdiction.
b. Installer Training Meeting Certification: Letter of compliance, signed by Contractor, attesting to completion of installer training meeting specified in “QUALITY ASSURANCE” article, herein.

4. Product Test Reports: For compliance with accessibility requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by qualified testing agency, for door hardware on doors located in accessible routes.

5. Warranty: Special warranty specified in this Section.

D. Closeout Submittals:

1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
   a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
   b. Catalog pages for each product.
   c. Name, address, and phone number of local representative for each manufacturer.
   d. Parts list for each product.
   e. Final approved hardware schedule, edited to reflect conditions as-installed.
   f. Final keying schedule.
   g. Copies of floor plans with keying nomenclature.
   h. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.
   i. Copy of warranties including appropriate reference numbers for manufacturers to identify project.

1.5 QUALITY ASSURANCE

A. Product Substitutions: Comply with product requirements stated in Division 01 and as specified herein.

B. Supplier Qualifications and Responsibilities: Recognized architectural hardware supplier with record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that provides certified Architectural Hardware Consultant (AHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.

1. Warehousing Facilities: In Project's vicinity.
2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
4. Coordination Responsibility: Coordinate installation of electronic security hardware with Architect and electrical engineers and provide installation and technical data to Architect and other related subcontractors.
   a. Upon completion of electronic security hardware installation, inspect and verify that all components are working properly.
C. Installer Qualifications: Qualified tradesmen, skilled in application of commercial grade hardware with record of successful in-service performance for installing door hardware similar in quantity, type, and quality to that indicated for this Project.

D. Architectural Hardware Consultant Qualifications: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:

1. For door hardware, DHI-certified, Architectural Hardware Consultant (AHC).
2. Can provide installation and technical data to Architect and other related subcontractors.
3. Can inspect and verify components are in working order upon completion of installation.
5. Capable of coordinating installation of electrified hardware with Architect and electrical engineers.

E. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated.
2. Manufacturers that perform electrical modifications and that are listed by testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.

F. Fire-Rated Door Openings: Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and are identical to products tested by Underwriters Laboratories, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.

G. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.

1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.

H. Means of Egress Doors: Latches do not require more than 15 lbf (67 N) to release latch. Locks do not require use of key, tool, or special knowledge for operation.

I. Accessibility Requirements: For door hardware on doors in an accessible route, comply with governing accessibility regulations cited in “REFERENCES” article, herein.

1. Provide operating devices that do not require tight grasping, pinching, or twisting of wrist and that operate with force of not more than 5 lbf (22.2 N).
2. Maximum opening-force requirements:
   a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
   b. Sliding or Folding Doors: 5 lbf (22.2 N) applied parallel to door at latch.
   c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
3. Bevel raised thresholds with slope of not more than 1:2. Provide thresholds not more than 1/2 inch (13 mm) high.
4. Adjust door closer sweep periods so that, from open position of 70 degrees, door will take at least 3 seconds to move to 3 inches (75 mm) from latch, measured to leading edge of door.

J. Keying Conference: Conduct conference at Project site to comply with requirements in Division 01.
   2. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
      a. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
      b. Preliminary key system schematic diagram.
      c. Requirements for key control system.
      d. Requirements for access control.
      e. Address for delivery of keys.

K. Pre-installation Conference: Conduct conference at Project site.
   1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   2. Inspect and discuss preparatory work performed by other trades.
   3. Inspect and discuss electrical roughing-in for electrified door hardware.
   4. Review sequence of operation for each type of electrified door hardware.
   5. Review required testing, inspecting, and certifying procedures.

L. Coordination Conferences:
   1. Installation Coordination Conference: Prior to hardware installation, schedule and hold meeting to review questions or concerns related to proper installation and adjustment of door hardware.
      a. Attendees: Door hardware supplier, door hardware installer, Contractor.
      b. After meeting, provide letter of compliance to Architect, indicating when meeting was held and who was in attendance.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site.

B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.
   1. Deliver each article of hardware in manufacturer’s original packaging.
C. Project Conditions:
   1. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
   2. Provide secure lock-up for door hardware delivered to Project, but not yet installed. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.

D. Protection and Damage:
   1. Promptly replace products damaged during shipping.
   2. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work.
   3. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.

E. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

F. Deliver keys to Owner by registered mail or overnight package service.

1.7 COORDINATION

A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete. Concrete, reinforcement, and formwork requirements are specified in Division 03.

B. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.

D. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

E. Direct shipments not permitted, unless approved by Contractor.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

   1. Warranty Period: Years from date of Substantial Completion, for durations indicated.
      a. Closers:
         1) Mechanical: 30 years.
Westby Hall
Facade & Courtyard Restoration

b. Locksets:
   1) Mechanical: 3 years.

c. Continuous Hinges: Lifetime warranty.
d. Key Blanks: Lifetime

2. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.

1.9 MAINTENANCE

A. Maintenance Tools:

1. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Approval of products from manufacturers indicated as “Acceptable Manufacturer” is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer’s product.

<table>
<thead>
<tr>
<th>Item</th>
<th>Scheduled Manufacturer</th>
<th>Acceptable Manufacturer</th>
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</thead>
<tbody>
<tr>
<td>Hinges</td>
<td>Ives (IVE)</td>
<td>Hager, McKinney, Stanley</td>
</tr>
<tr>
<td>Continuous Hinges</td>
<td>Ives (IVE)</td>
<td>Pemko, Stanley</td>
</tr>
<tr>
<td>Electric Power Transfer</td>
<td>Von Duprin (VON)</td>
<td>ABH, Securitron</td>
</tr>
<tr>
<td>Flush Bolt</td>
<td>Ives (IVE)</td>
<td>Burns, Rockwood</td>
</tr>
<tr>
<td>Surface Bolts</td>
<td>Ives (IVE)</td>
<td>Burns, Rockwood</td>
</tr>
<tr>
<td>Coordinators</td>
<td>Ives (IVE)</td>
<td>Burns, Rockwood</td>
</tr>
<tr>
<td>Locksets &amp; Deadlocks, Aux Locks</td>
<td>Best (BES)</td>
<td>Schlage, Sargent</td>
</tr>
<tr>
<td>Exit Devices &amp; Mullions</td>
<td>Von Duprin (VON)</td>
<td>Sargent, Precision</td>
</tr>
<tr>
<td>Cylinders &amp; Keying</td>
<td>Best (BES)</td>
<td></td>
</tr>
<tr>
<td>Door Closers</td>
<td>LCN (LCN)</td>
<td>Sargent, Corbin</td>
</tr>
<tr>
<td>Electro-Hydraulic Automatic Operators</td>
<td>LCN (LCN)</td>
<td>Besam, Norton</td>
</tr>
<tr>
<td>Door Trim</td>
<td>Ives (IVE)</td>
<td>Burns, Rockwood</td>
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<tr>
<td>Protection Plates</td>
<td>Ives (IVE)</td>
<td>Burns, Rockwood</td>
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</tbody>
</table>
Westby Hall
Facade & Courtyard Restoration

<table>
<thead>
<tr>
<th>Overhead Stops</th>
<th>Glynn-Johnson (GLY)</th>
<th>Rixson, Sargent</th>
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<tbody>
<tr>
<td>Stops &amp; Holders</td>
<td>Ives (IVE)</td>
<td>Burns, Rockwood</td>
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<tr>
<td>Thresholds &amp; Weatherstrip</td>
<td>Zero (ZER)</td>
<td>Pemko, Reese</td>
</tr>
<tr>
<td>Silencers</td>
<td>Ives (IVE)</td>
<td>Burns, Rockwood</td>
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<tr>
<td>Door Position Switches</td>
<td>Schlage Electronics (SCE)</td>
<td>GE, Sargent</td>
</tr>
<tr>
<td>Key Cabinets</td>
<td>Telkee (TEL)</td>
<td>HPC, Lund</td>
</tr>
</tbody>
</table>

B. Hand of Door: Drawings show direction of slide, swing, or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.

C. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.2 MATERIALS

A. Fasteners

1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units exposed when door is closed except when no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless thru-bolts are required to fasten hardware securely. Review door specification and advise Architect if thru-bolts are required.
4. Install hardware with fasteners provided by hardware manufacturer.

B. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.

1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

2.3 HINGES

A. Provide five-knuckle, ball bearing hinges.

1. Manufacturers and Products:

B. Requirements:

1. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
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Facade & Courtyard Restoration

a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high

2. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
   a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
   b. Interior: Heavy weight, steel, 5 inches (127 mm) high

3. 2 inches or thicker doors:
   a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
   b. Interior: Heavy weight, steel, 5 inches (127 mm) high

4. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
5. Where new hinges are specified for existing doors or existing frames, provide new hinges of identical size to hinge preparation present in existing door or existing frame.
6. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
   a. Steel Hinges: Steel pins
   b. Non-Ferrous Hinges: Stainless steel pins
   c. Out-Swinging Exterior Doors: Non-removable pins
   d. Out-Swinging Interior Lockable Doors: Non-removable pins
   e. Interior Non-lockable Doors: Non-rising pins

7. Width of hinges: 4-1/2 inches (114 mm) at 1-3/4 inch (44 mm) thick doors, and 5 inches (127 mm) at 2 inches (51 mm) or thicker doors. Adjust hinge width as required for door, frame, and wall conditions to allow proper degree of opening.
8. Doors 36 inches (914 mm) wide or less furnish hinges 4-1/2 inches (114 mm) high; doors greater than 36 inches (914 mm) wide furnish hinges 5 inches (127 mm) high, heavy weight or standard weight as specified.
9. Provide hinges with electrified options as scheduled in the hardware sets. Provide with sufficient number and wire gage to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component.
10. Provide mortar guard for each electrified hinge specified, unless specified in hollow metal frame specification.
11. Provide spring hinges where specified. Provide two spring hinges and one bearing hinge per door leaf for doors 90 inches (2286 mm) or less in height. Provide one additional bearing hinge for each 30 inches (762 mm) of additional door height.

2.4 CONTINUOUS HINGES

A. Aluminum Geared
   1. Manufacturers:
      a. Scheduled Manufacturer: Ives.
   2. Requirements:
a. Provide aluminum geared continuous hinges conforming to ANSI A156.25, Grade 2.
b. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.
c. Provide nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
d. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
e. On fire-rated doors, provide aluminum geared continuous hinges that are classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
f. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with sufficient number and wire gage to accommodate electric function of specified hardware.
g. Install hinges with fasteners supplied by manufacturer.
h. Provide hinges with symmetrical hole pattern.

2.5 FLUSH BOLTS

A. Manufacturers:
   1. Scheduled Manufacturer: Ives
   2. Acceptable Manufacturers: Burns, Rockwood

B. Requirements:
   1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

2.6 COORDINATORS

A. Manufacturers:
   1. Scheduled Manufacturer: Ives
   2. Acceptable Manufacturers: Burns, Rockwood

B. Requirements:
   1. Where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that requires synchronized closing of the doors, provide bar-type coordinating device, surface applied to underside of stop at frame head.
   2. Provide filler bar of correct length for unit to span entire width of opening, and appropriate brackets for parallel arm door closers and surface vertical rod exit device strikes. Factory-prep coordinators for vertical rod devices if required.
2.7 CYLINDRICAL LOCKS – GRADE 1

A. Manufacturers and Products:
   1. Scheduled Manufacturer and Product: Best 9K Series

B. Requirements:
   1. Provide cylindrical locks conforming to ANSI A156.2 Series 4000, Grade 1. Cylinders:
      Refer to “KEYING” article, herein.
   2. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with
      1/2 inch latch throw. Provide proper latch throw for UL listing at pairs.
   3. Provide locksets with thru-bolts, and no exposed screws.
   4. Provide independently operating levers with two external return spring cassettes mounted
      under roses to prevent lever sag.
   5. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
   6. Provide electrified options as scheduled in the hardware sets.
   7. Lever Trim: Solid cast levers without plastic inserts, and wrought roses on both sides.
      a. Lever Design: Best 15D.
      b. Tactile Warning (Knurling): Where required by authority having jurisdiction.
         Provide on levers on exterior (secure side) of doors serving rooms considered to be
         hazardous.

2.8 AUXILIARY LOCKS

A. Deadlocks:
   1. Manufacturers and Products:
      a. Scheduled Manufacturer and Product: Best 48H series

   2. Requirements:
      a. Provide mortise deadlock series conforming to ANSI A156 and function as
         specified. Cylinders: Refer to “KEYING” article, herein.
      b. Provide deadlocks with standard 2-3/4 inches (70 mm) backset. Provide deadbolt
         with full 1 inch (25 mm) throw, constructed of stainless steel.
      c. Provide manufacturer’s standard strike.

2.9 EXIT DEVICES

A. Manufacturers and Products:
   2. Acceptable Manufacturers and Products: Sargent 80 series, Precision Apex series

B. Requirements:
1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1, and UL listed for Panic Exit or Fire Exit Hardware. Cylinders: Refer to “KEYING” article, herein.

2. Provide touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.

3. Touchpad: Extend minimum of one half of door width. Match exit device finish, stainless steel for US26, US26D, US28, US32, and US32D finishes; and for all other finishes, provide compatible finish to exit device. Provide compression springs in devices, latches, and outside trims or controls; tension springs also acceptable.

4. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.

5. Provide exit devices with manufacturer’s approved strikes.

6. Provide exit devices cut to door width and height. Locate exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.

7. Mount mechanism case flush on face of doors, or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.

8. Provide cylinder or hex-key dogging (as indicated) at non-fire-rated exit devices, unless specified less dogging.

9. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion that is removed by use of a keyed cylinder, which is self-locking when re-installed.

10. Where lever handles are specified as outside trim for exit devices, provide heavy-duty lever trims with forged or cast escutcheon plates. Provide vandal-resistant or freewheeling levers.

    a. Lever Style: Match lever style of locksets.
    b. Tactile Warning (Knurling): Where required by authority having jurisdiction. Provide on levers on exterior (secure side) of doors serving rooms considered to be hazardous.

11. Provide UL labeled fire exit hardware for fire rated openings.

12. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.

13. Provide electrified options as scheduled.

2.10 CYLINDERS

A. Manufacturer:

    1. Scheduled Manufacturer: Best Key System, No Substitute

B. Requirements: Provide cylinders/cores complying with the following requirements.

    1. Furnished by same manufacturer as locks.
    2. Cylinders/cores compliant with ANSI/BHMA A156.5; latest revision, Section 12, Grade 1; permanent cylinders; cylinder face finished to match lockset, manufacturer’s series as indicated.

C. Full-sized cylinders in the below-listed configuration(s), distributed throughout the Project as indicated.
1. Conventional cylinder with interchangeable core (SFIC) core with keyway compatible with existing system.

2. Keying:

D. Manufacturer-keyed permanent cylinders/cores, configured into existing keying system per “KEYING” article herein.

E. Nickel silver bottom pins.

1. Identification:

F. Mark permanent cylinders/cores and keys with applicable blind code per DHI publication “Keying Systems and Nomenclature” for identification. Blind code marks shall not include actual key cuts.

G. Identification stamping provisions must be approved by the Architect and Owner.

H. Construction Keying System.

I. 3 construction control keys and extractor tool, if required.

J. 12 construction change (day) keys.

1. Owner or Owner’s Representative will void operation of temporary construction keys.

K. Replaceable Construction Cores.

1. Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.

L. 12 construction change (day) keys.

1. Owner or Owner’s Representative will replace temporary construction cores with permanent cores.

2.11 KEYING

A. Keying System: Factory registered, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

B. Keying System: Existing system maintained by Owner or Owners representative, incorporating decisions made at keying conference.

C. Keying Requirements – General

1. Permanent cylinders/cores keyed by the manufacturer according to the following key system.

D. Keying system tied into existing system as directed by the Owner.
1. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements shall be cause for replacement of cylinders/cores involved at no additional cost to Owner.

E. Keys

1. Material: Nickel silver; minimum thickness of .092-inch (2.3mm)
2. Identification:

F. Coordinate with cylinder/core and key identification requirements above.

G. Stamp keys with Owner’s unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with “DO NOT DUPLICATE” along with the “PATENTED” or patent number to enforce the patent protection.

H. Failure to comply with stamping requirements shall be cause for replacement of keys involved at no additional cost to Owner.

1. Quantity: Furnish in the following quantities.
   a. Change (Day) Keys: 3 per cylinder/core.
   b. Permanent Control Keys: 3.

2.12 KEY CONTROL SYSTEM

A. Key Control System Manufacturers:

1. Scheduled Manufacturer: Telkee
2. Acceptable Manufacturers: HPC, Lund

B. Requirements:

1. Provide key control system, including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150% of number of locks required for Project.
   a. Provide complete cross index system set up by hardware supplier, and place keys on markers and hooks in cabinet as determined by final key schedule.
   b. Provide hinged-panel type cabinet for wall mounting.

2.13 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: LCN 4010/4110/4020 series

B. Requirements:
1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder.
3. Cylinder Body: 1-1/2 inch (38 mm) diameter.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves with separate adjustment for latch speed, general speed, and backcheck.
7. Provide closers with a solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers.
8. Pressure Relief Valve (PRV) Technology: Not permitted.
9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.14 DOOR TRIM

A. Manufacturers:
   1. Scheduled Manufacturer: Ives.

B. Requirements:
   1. Provide push plates 4 inches (102 mm) wide by 16 inches (406 mm) high by 0.050 inch (1 mm) thick and beveled 4 edges. Where width of door stile prevents use of 4 inches (102 mm) wide plate, adjust width to fit.
   2. Provide push bars of solid bar stock, diameter and length as scheduled. Provide push bars of sufficient length to span from center to center of each stile. Where required, mount back to back with pull.
   3. Provide offset pulls of solid bar stock, diameter and length as scheduled. Where required, mount back to back with push bar.
   4. Provide flush pulls as scheduled. Where required, provide back-to-back mounted model.
   5. Provide pulls of solid bar stock, diameter and length as scheduled. Where required, mount back to back with push bar.
   6. Provide pull plates 4 inches (102 mm) wide by 16 inches (406 mm) high by 0.050 inch (1 mm) thick, beveled 4 edges, and prepped for pull. Where width of door stile prevents use of 4 inches (102 mm) wide plate, adjust width to fit.
   7. Provide wire pulls of solid bar stock, diameter and length as scheduled.
   8. Provide decorative pulls as scheduled. Where required, mount back to back with pull.
2.15 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer: Ives.

B. Requirements:

1. Provide kick plates, mop plates, and armor plates minimum of 0.050 inch (1 mm) thick as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes of plates:
   a. Kick Plates: 8 inches (254 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs
   b. Mop Plates: 8 inches (102 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs
   c. Armor Plates: 34 inches (914 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs

2.16 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturers: Glynn-Johnson
2. Acceptable Manufacturers: Rixson, Sargent

B. Requirements:

1. Provide heavy duty concealed mounted overhead stop or holder as specified for exterior and interior vestibule single acting doors.
2. Provide heavy duty concealed mounted overhead stop or holder as specified for double acting doors.
3. Provide heavy or medium duty and concealed or surface mounted overhead stop or holder for interior doors as specified. Provide medium duty surface mounted overhead stop for interior doors and at any door that swings more than 140 degrees before striking wall, open against equipment, casework, sidelights, and where conditions do not allow wall stop or floor stop presents tripping hazard.
4. Where overhead holders are specified provide friction type at doors without closer and positive type at doors with closer.

2.17 DOOR STOPS AND HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer: Ives.

B. Provide door stops at each door leaf:
1. Provide wall stops wherever possible. Provide convex type where mortise type locks are used and concave type where cylindrical type locks are used.
2. Where a wall stop cannot be used, provide universal floor stops for low or high rise options.
3. Where wall or floor stop cannot be used, provide medium duty surface mounted overhead stop.

2.18 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:

B. Requirements:
   1. Provide thresholds, weatherstripping (including door sweeps, seals, astragals) and gasketing systems (including smoke, sound, and light) as specified and per architectural details. Match finish of other items.
   2. Size of thresholds:
      a. Saddle Thresholds: 1/2 inch (13 mm) high by jamb width by door width
      b. Bumper Seal Thresholds: 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width
   3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.

2.19 SILENCERS

A. Manufacturers:
   1. Scheduled Manufacturer: Ives.

B. Requirements:
   1. Provide "push-in" type silencers for hollow metal or wood frames.
   2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
   3. Omit where gasketing is specified.

2.20 COAT HOOKS

A. Acceptable manufacturers and products: Ives, Burns, Rockwood.

B. Provide coat hooks as specified.
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2.21 FINishes

A. Finish: BHMA 626/652 (US26D); except:

1. Hinges at Exterior Doors: BHMA 630 (US32D)
2. Continuous Hinges: BHMA 628 (US28)
4. Protection Plates: BHMA 630 (US32D)
5. Overhead Stops and Holders: BHMA 630 (US32D)
6. Door Closers: Powder Coat to Match
7. Wall Stops: BHMA 630 (US32D)
8. Latch Protectors: BHMA 630 (US32D)
9. Weatherstripping: Clear Anodized Aluminum
10. Thresholds: Mill Finish Aluminum

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

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

3.2 PREPARATION

A. Where on-site modification of doors and frames is required:

1. Remove existing hardware being replaced, tag, and store according to contract documents.
2. Field modify and prepare existing door and frame for new hardware being installed.
3. When modifications are exposed to view, use concealed fasteners, when possible.
4. Prepare hardware locations in accordance with:

   a. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
   b. Wood Doors: DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."
   c. Doors in rated assemblies: NFPA 80 for restrictions on on-site door hardware preparation.
3.3 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.

2. Custom Steel Doors and Frames: HMMA 831.

B. Install each hardware item in compliance with manufacturer’s instructions and recommendations, using only fasteners provided by manufacturer.

C. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.

D. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.

E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

F. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.

G. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

H. Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every 30 inches (750 mm) of door height greater than 90 inches (2286 mm).

I. Lock Cylinders: Install construction cores to secure building and areas during construction period.

   1. Replace construction cores with permanent cores as indicated in keying section.

J. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

K. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Closers shall not be visible in corridors, lobbies and other public spaces unless approved by Architect.

L. Closer/Holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.

M. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
N. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.

O. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

P. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

Q. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.4 FIELD QUALITY CONTROL

A. Architectural Hardware Consultant: Engage qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.

1. Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

3.6 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.7 DEMONSTRATION

A. Provide training for Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes. Refer to Division 01 Section "Demonstration and Training."
3.8 DOOR HARDWARE SCHEDULE

A. Locksets, exit devices, and other hardware items are referenced in the following hardware sets for series, type and function. Refer to the above-specifications for special features, options, cylinders/keying, and other requirements.

B. Hardware Sets:

Hardware Group No. 01

Provide each PR door(s) with the following:

<table>
<thead>
<tr>
<th>Qty</th>
<th>Description</th>
<th>Catalog Number</th>
<th>Finish</th>
<th>Mfr</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>CONT. HINGE</td>
<td>112HD</td>
<td>628</td>
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<td>1</td>
<td>REMOVABLE MULLION</td>
<td>5654</td>
<td>628</td>
<td>VON</td>
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<tr>
<td>2</td>
<td>PANIC HARDWARE</td>
<td>98-L-06-WH PBAR</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>2</td>
<td>RIM CYLINDER</td>
<td>1E72</td>
<td>626</td>
<td>BES</td>
</tr>
<tr>
<td>2</td>
<td>PERMANENT CORE</td>
<td></td>
<td>626</td>
<td>BES</td>
</tr>
<tr>
<td></td>
<td>PROVIDE IN PROPER KEYWAY AS REQUIRED TO MATCH EXISTING KEY SYSTEM.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>SURFACE CLOSER</td>
<td>4111 SCUSH SRI</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>2</td>
<td>MOUNTING PLATE</td>
<td>SRI 4110-18</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>2</td>
<td>CUSH SHOE SUPPORT</td>
<td>SRI 4110-30</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>2</td>
<td>BLADE STOP SPACER</td>
<td>SRI 4110-61</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>WEATHERSTRIPING</td>
<td></td>
<td></td>
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<tr>
<td>1</td>
<td>THRESHOLD</td>
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<tr>
<td>2</td>
<td>DOOR CONTACT</td>
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</tbody>
</table>

Hardware Group No. 02

Provide each SGL door(s) with the following:

<table>
<thead>
<tr>
<th>Qty</th>
<th>Description</th>
<th>Catalog Number</th>
<th>Finish</th>
<th>Mfr</th>
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<tbody>
<tr>
<td>1</td>
<td>CONT. HINGE</td>
<td>112HD</td>
<td>628</td>
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<tr>
<td>1</td>
<td>PANIC HARDWARE</td>
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<td>626</td>
<td>VON</td>
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<tr>
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<td>RIM CYLINDER</td>
<td>1E72</td>
<td>626</td>
<td>BES</td>
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<tr>
<td>1</td>
<td>PERMANENT CORE</td>
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<td>626</td>
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<td></td>
<td>PROVIDE IN PROPER KEYWAY AS REQUIRED TO MATCH EXISTING KEY SYSTEM.</td>
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<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4111 SCUSH SRI</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>MOUNTING PLATE</td>
<td>SRI 4110-18</td>
<td>689</td>
<td>LCN</td>
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<tr>
<td>1</td>
<td>CUSH SHOE SUPPORT</td>
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<td>LCN</td>
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<tr>
<td>1</td>
<td>DOOR CONTACT</td>
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END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Windows.
2. Doors.
4. Storefront framing.

1.2 PRECONSTRUCTION TESTING

A. Preconstruction Adhesion and Compatibility Testing: Test each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.

1. Testing will not be required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.

1.3 SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches (300 mm) square.

C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

D. Preconstruction adhesion and compatibility test report.

1.4 QUALITY ASSURANCE

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.


B. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

1.5 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form in which coated-glass manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS, GENERAL

A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.

B. Strength: Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.

C. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

1. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).
2. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
3. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.2 GLASS PRODUCTS

A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.

1. Products: Subject to compliance with requirements, provide one of the following:
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- Vitro Architectural Glass; Solarban 60. or approved equal.

**B. Heat-Treated Float Glass:** ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.

**C. Silicone-Coated Spandrel Glass:** ASTM C 1048, Condition C, Type I, Quality-Q3, and complying with other requirements specified.

1. **Products:** Subject to compliance with requirements, provide the following:
   - ICD High Performance Coatings; OPACI-Coat-300 Spandrel Glass.
   - Or approved equal.

2. **Glass:** Clear float.
3. **Silicone Coating Color:** As selected by Architect from manufacturer's full range.

**2.3 UV RESISTANT LAMINATED GLASS**

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

2. Or approved equal.

**B. Laminated Glass:** ASTM C 1172, and complying with testing requirements in 16 CFR 1201 for Category II materials, and with other requirements specified. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

1. **Construction:** Laminate glass with UV resistant interlayer to comply with interlayer manufacturer's written recommendations.
2. **Interlayer Thickness:** Provide thickness not less than that indicated and as needed to comply with requirements.
3. **Interlayer Color:** Clear unless otherwise indicated.

**2.4 INSULATING GLASS**

**A. Insulating-Glass Units:** Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190, and complying with other requirements specified.

1. **Sealing System:** Dual seal.
2. **Spacer:** Aluminum with mill or clear anodic finish.

**2.5 GLAZING SEALANTS**

**A. General:**
1. **Compatibility**: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

2. **Suitability**: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.

3. **VOC Content**: For sealants used inside of the weatherproofing system, not more than 250 g/L when calculated according to 40 CFR 59, Subpart D.

4. **Colors of Exposed Glazing Sealants**: As selected by Architect from manufacturer's full range.

**B. Glazing Sealant**: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

### 2.6 GLAZING TAPES

**A. Back-Bedding Mastic Glazing Tapes**: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

**B. Expanded Cellular Glazing Tapes**: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

### 2.7 MISCELLANEOUS GLAZING MATERIALS

**A. Cleaners, Primers, and Sealers**: Types recommended by sealant or gasket manufacturer.

**B. Setting Blocks**: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

**C. Spacers**: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

**D. Edge Blocks**: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

**E. Cylindrical Glazing Sealant Backing**: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.
F. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

2.8 INSULATING-GLASS TYPES

A. Glass Type [GL-1]: Low-e-coated, clear insulating glass.
   1. Overall Unit Thickness: 1 inch (25 mm).
   2. Thickness of Each Glass Lite: 6.0 mm.
   3. Outdoor Lite: Fully tempered float glass.
   4. Interspace Content: Argon.
   5. Indoor Lite: Fully tempered float glass.
   7. Visible Light Transmittance: 70 percent minimum.
   8. Winter Nighttime U-Factor: 0.24 maximum.

B. Glass Type [GL-2]: Silicone-coated, low-e, insulating spandrel glass.
   1. Overall Unit Thickness: 1 inch (25 mm).
   2. Thickness of Each Glass Lite: 6.0 mm.
   3. Outdoor Lite: Fully tempered float glass.
   4. Interspace Content: Argon.
   5. Indoor Lite: Fully tempered float glass.
   7. Opaque Coating Location: Fourth surface.
   8. Winter Nighttime U-Factor: 0.24 maximum.

2.9 INSULATING-LAMINATED-GLASS TYPES

A. Glass Type [GL-3]: Low-e-coated, UV resistant, clear insulating laminated glass.
   1. Overall Unit Thickness: 1 inch (25 mm) <insert dimension>.
   2. Thickness of Outdoor Lite: 6.0 mm.
   3. Outdoor Lite: Fully tempered float glass.
   4. Interspace Content: Argon.
   5. Indoor Lite: Clear laminated glass with two plies of fully tempered float glass.
      a. Thickness of Each Glass Ply: 3.0 mm.
      b. Interlayer Thickness: Per manufacturer.
   7. Visible Light Transmittance: 69% percent minimum.
   8. UV Transmittance: 0.1% percent maximum.
   9. U-Factor: 0.245 maximum.
   10. Solar Heat Gain Coefficient: 0.379 maximum.
PART 3 - EXECUTION

3.1 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

3.2 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Apply heel bead of elastomeric sealant.
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F. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

G. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.3 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.4 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.5 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.
B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

END OF SECTION 088000
SECTION 092400 - PORTLAND CEMENT STUCCO

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Exterior portland cement plasterwork (stucco) on metal lath, unit masonry, and monolithic concrete.

1.2 SUBMITTALS

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

B. Shop Drawings: Show locations and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other work.

C. Samples: For each type of factory-prepared finish coat indicated.

1.3 QUALITY ASSURANCE

A. Fire-Resistance Ratings: Where indicated, provide portland cement plaster assemblies identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

B. Mockups: Before plastering, install mockups of at least 100 sq. ft. (9.3 sq. m) in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 PROJECT CONDITIONS

A. Comply with ASTM C 926 requirements.

B. Factory-Prepared Finishes: Comply with manufacturer's written recommendations for environmental conditions for applying finishes.

PART 2 - PRODUCTS

2.1 METAL LATH

1. Diamond-Mesh Lath: 2.5 lb/sq. yd. (1.4 kg/sq. m).

B. Paper Backing: FS UU-B-790, Type I, Grade B, Style 1a vapor-retardant paper.
   1. Provide paper-backed lath unless otherwise indicated.

2.2 ACCESSORIES

A. General: Comply with ASTM C 1063 and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.

B. Metal Accessories:
      a. Small-nose style; use unless otherwise indicated.
   5. Casing Beads: Fabricated from [zinc-coated (galvanized) steel; square-edged style; with expanded flanges.
   6. Control Joints: Fabricated from zinc-coated (galvanized) steel; one-piece-type, folded pair of unperforated screeds in M-shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.
   7. Expansion Joints: Fabricated from zinc-coated (galvanized) steel; folded pair of unperforated screeds in M-shaped configuration; with expanded flanges.

2.3 MISCELLANEOUS MATERIALS

A. Water for Mixing: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.

B. Fiber for Base Coat: Alkaline-resistant glass or polypropylene fibers, 1/2 inch (13 mm) long, free of contaminants, manufactured for use in portland cement plaster.

C. Bonding Compound: ASTM C 932.

D. Steel Drill Screws: For metal-to-metal fastening, ASTM C 1002 or ASTM C 954, as required by thickness of metal being fastened; with pan head that is suitable for application; in lengths required to achieve penetration through joined materials of no fewer than three exposed threads.

E. Fasteners for Attaching Metal Lath to Substrates: Complying with ASTM C 1063.

F. Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, not less than 0.0475-inch (1.21-mm) diameter, unless otherwise indicated.
2.4 PLASTER MATERIALS

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

B. Colorants for Job-Mixed Finish Coats: Colorfast mineral pigments that produce finish plaster color to match existing.

C. Lime: ASTM C 206, Type S; or ASTM C 207, Type S.

D. Sand Aggregate: ASTM C 897.

2.5 PLASTER MIXES

A. General: Comply with ASTM C 926 for applications indicated.
   1. Fiber Content: Add fiber to base-coat mixes after ingredients have mixed at least two minutes. Comply with fiber manufacturer’s written instructions for fiber quantities in mixes, but do not exceed 1 lb of fiber/cu. yd. (0.6 kg of fiber/cu. m) of cementitious materials.

B. Base-Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork as follows:
   1. Portland Cement Mixes:
      a. Scratch Coat: For cementitious material, mix 1 part portland cement and 0 to 3/4 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
      b. Brown Coat: For cementitious material, mix 1 part portland cement and 0 to 3/4 parts lime. Use 3 to 5 parts aggregate per part of cementitious material, but not less than volume of aggregate used in scratch coat.

C. Job-Mixed Finish-Coat Mixes:
   1. Portland Cement Mix: For cementitious materials, mix 1 part portland cement and 3/4 to 1-1/2 parts lime. Use 1-1/2 to 3 parts aggregate per part of cementitious material.
   2. Masonry Cement Mix: 1 part masonry cement and 1-1/2 to 3 parts aggregate.
   3. Portland and Masonry Cement Mix: For cementitious materials, mix 1 part portland cement and 1 part masonry cement. Use 1-1/2 to 3 parts aggregate per part of cementitious material.
   4. Plastic Cement Mix: 1 part plastic cement and 1-1/2 to 3 parts aggregate.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.
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B. Prepare solid substrates for plaster that are smooth or that do not have the suction capability required to bond with plaster according to ASTM C 926.

3.2 INSTALLATION, GENERAL  

A. Acoustical Sealant: Where required, seal joints between edges of plasterwork and abutting construction with acoustical sealant.

3.3 INSTALLING METAL LATH  

A. Expanded-Metal Lath: Install according to ASTM C 1063.  
   2. Flat-Ceiling and Horizontal Framing: Install flat diamond-mesh lath.

3.4 INSTALLING ACCESSORIES  

A. Install according to ASTM C 1063 and at locations indicated on Drawings.  

B. Reinforcement for External Corners:  
   1. Install lath-type, external-corner reinforcement at exterior locations.

C. Control Joints: Install control joints at locations indicated on Drawings

3.5 PLASTER APPLICATION  

A. General: Comply with ASTM C 926.

B. Bonding Compound: Apply on unit masonry and concrete plaster bases.

C. Walls; Base-Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork, on masonry, on concrete; 3/4-inch (19-mm) thickness.
   1. Portland cement mixes.

D. Plaster Finish Coats: Apply to provide finish to match existing.

3.6 PLASTER REPAIRS  

A. Repair or replace work to eliminate cracks, dents, blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

END OF SECTION 092400
SECTION 099653 - ELASTOMERIC COATINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and application of elastomeric coatings to exterior stucco substrates.

1.2 SUBMITTALS

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

B. Samples: For each exposed product and for each color and gloss specified.

C. Product List: Printout of current "MPI Approved Products List" for each product category specified in Part 2 that specifies coatings approved by MPI, with the proposed product highlighted.

1.3 QUALITY ASSURANCE

A. MPI Standards: Comply with MPI standards indicated and provide elastomeric coatings listed in its "MPI Approved Products List."


B. Mockups: Prepare two mockups of each coating system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select two wall surfaces of at least [100 sq. ft. (9.3 sq. m)] to represent surfaces and conditions for application of each type and texture of elastomeric coating.

2. Final approval of color and texture selections will be based on mockups.

   a. If preliminary color selections are not approved, prepare additional mockups of additional color and textures selected by Architect at no added cost to Owner.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Material Compatibility:
1. Provide elastomeric finish coatings and crack fillers, primers, and block fillers as applicable for use within elastomeric finish coatings that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

2. For each material or coat, provide products and spreading rates recommended in writing by elastomeric-coating manufacturer for use on substrate indicated.

2.2 ELASTOMERIC FINISH COATINGS

A. Exterior Non-Flat Waterborne, Pigmented Elastomeric Coating: MPI #38.

1. Products: Subject to compliance with requirements, provide the following:
   a. BASF Building Systems; Thoro Thorolastic.
   b. Benjamin Moore & Co.; Moorlastic.
   c. Sto Acryl Plus.
   d. Or approved equal.

2. Surface Profile: Smooth texture.

3. VOC Content: 100 g/L or less.

4. Moisture-Vapor Transmission: Minimum 30 perms, based on testing according to ASTM D 1653.

2.3 OTHER MATERIALS

A. Crack Fillers: Elastomeric-coating manufacturer's recommended, factory-formulated crack fillers or sealants, including crack filler primers, compatible with substrate and other materials indicated; VOC content complying with limits of authorities having jurisdiction.

B. Primer: Elastomeric-coating manufacturer's recommended, factory-formulated, alkali-resistant primer compatible with substrate and other materials indicated.

C. Concrete Unit Masonry Block Filler: Elastomeric-coating manufacturer's recommended, factory-formulated, high-performance latex block filler compatible with substrate and other materials indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with manufacturer's requirements for maximum moisture content, alkalinity, and other conditions affecting performance of work.

B. Begin coating only when moisture content of substrate is 12 percent or less when measured with an electronic moisture meter.
C. Begin coating no sooner than 28 days after substrate is constructed and is visually dry on both sides.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in the "MPI Architectural Painting Specification Manual" applicable to substrates and coating systems indicated.

B. Remove hardware and hardware accessories, plates, machined surfaces, light fixtures, and similar items already installed that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating.

1. After completing coating operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Crack Repair: Fill cracks according to manufacturer's written instructions before coating surfaces.

3.3 APPLICATION

A. Apply elastomeric coatings according to manufacturer's written instructions.

B. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 COATING SCHEDULE

A. Stucco Substrates:

1. Primer: Stucco primer if required by manufacturer.
2. Elastomeric Finish Coat(s): Manufacturer's recommended number of coats and total dry film thickness for condition of substrate.
3. Finish-Coat Color: As selected by Architect from manufacturer's full range.

END OF SECTION 099653
SECTION 107113 - EXTERIOR SUN CONTROL DEVICES

PART 1 - GENERAL

1.1 Related Documents
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 Summary
A. Section includes: Kawneer Aluminum Sunshade Systems, including accessories, mountings, and shims. Sunshades are anchored directly to the vertical curtain wall or storefront mullions.
B. Related Sections:
   1. 079200 “Joint Sealants”
   2. 084113 “Aluminum-Framed Storefronts”
   3. 084313.1 “Aluminum-Framed Entrances”
   4. 084413 “Glazed Aluminum Curtain Walls”
   5. 088000 “Glazing”

1.3 Definitions
A. Definitions: For fenestration industry standard terminology and definitions refer to American Architectural Manufacturers Association (AAMA) – AAMA Glossary (AAMA AG).

1.4 Performance Requirements
A. Delegated Design: Design exterior sun control devices, including comprehensive engineering analysis by a qualified professional engineer licensed in the state of NJ, using performance requirements and design criteria indicated.
B. Structural Performance:
   1. Combined load on sunshade configurations to be determined in accordance with ASCE 7 or applicable code requirements. Combined load consists of wind, snow and ice loads.
   2. Design sunshade configurations to withstand stresses due to combined load. Stresses resulting from thermal expansion/contraction, shall not cause permanent deformation of sunshade assemblies or disengagement from the glazed system.
   3. The assembled sunshade shall be capable of supporting the specified combined load without damage, permanent deformation, or disengagement from the glazed system mullion.
   4. Blade deflection shall not exceed L/120 of span length.
   5. Submit test reports verifying compliance with each test requirement required by the project.
C. Shading Performance:
   1. Design of standard configurations will allow for negligible direct sunlight to show through the blades based on project location, latitude, altitude, building orientation, surrounding conditions, and aesthetic requirements, except for round, diamond and square louver styles.
D. Thermal Movements: Allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures:
   1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
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1.5 Submittals

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

A. Shop Drawings: For aluminum exterior sunshades. Include plans, elevations, sections, blade angles, blade spacing and attachments to compatible systems. Signed and sealed by a professional engineer licensed in the state of NJ.

B. Samples for Initial Selection: For units with factory-applied color finishes.

C. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

1.6 Quality Assurance

A. Installer Qualifications: Installer who has had successful experience with installation of the same or similar systems required for the project and other projects of similar size and scope.

B. Manufacturer Qualifications: A manufacturer capable of fabricating exterior sunshades, and glazed aluminum curtain walls and storefront systems that meet or exceed performance requirements.

C. Source Limitations: Obtain aluminum exterior sunshades and glazed aluminum curtain walls and storefront system through one source from a single manufacturer.

D. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If revisions are proposed, submit comprehensive explanatory data to Architect for review.

E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockups for type(s) of sunshade elevation(s) indicated, in location(s) shown on Drawings.

F. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section “Project Management and Coordination”.

1.7 Project Conditions

A. Field Measurements: Verify actual locations of structural supports for sunshades by field measurements before fabrication and indicate measurements on Shop Drawings.

1.8 Warranty

A. Manufacturer’s Warranty: Submit, for Owner’s acceptance, manufacturer’s standard warranty.

1. Warranty Period: Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by manufacturer.

B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes do not comply with requirements or that fail in
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materials or workmanship within specified warranty period. Warranty does not include normal weathering.

2. Warranty Period: Ten (10) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by manufacturer.

PART 2 - PRODUCTS

2.1 Manufacturers
A. Basis-of-Design Product:
   1. Versoleil Sunshade Outrigger System by Kawneer Company Inc.
   2. Or approved equal.
B. Substitutions: Refer to Substitutions Section for procedures and submission requirements.

2.2 Materials
A. Aluminum Extrusions: Alloy and temper recommended by glazed aluminum curtain wall and storefront system manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.070” wall thickness at any location for the main frame and complying with ASTM B 221: 6063-T6, 6105-T5, or 6061-T6 alloy and temper.
B. Thermal Barrier: When applied on a thermally broken captured system, sunshade shall be thermally isolated from the interior aluminum mullions by a nominal 0.25” (6.3 mm) thick low conductance material.
C. Aluminum sheet alloy: Shall meet the requirements of ASTM B209.
D. Sealant: For sealants required within fabricated sunshade system, provide permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.
E. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of glazed curtain wall and storefront members are nominal and in compliance with AA Aluminum Standards and Data.

2.3 Sunshades
A. Sunshade Members: Manufacturer's standard extruded or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
B. Fasteners and accessories: Nonmagnetic stainless steel to be non-corrosive and compatible with aluminum members, anchors, and other components.
C. Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.
D. Packing, Shipping, Handling and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
E. Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle sunshade materials and components to avoid damage. Protect sunshade materials against damage from elements, construction activities, and other hazards before, during and after installation.
2.4 Accessory Materials
   A. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

2.5 Fabrication
   A. Form or extrude aluminum shapes before finishing.
   B. Fabricate components that, when assembled, have the following characteristics:
      1. Profiles that are straight, and free of defects or deformations.
      2. Accurately fitted joints with ends coped or mitered.
      3. Physical and thermal isolation of glazing from framing members.
      4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
      5. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
   C. Sunshade: Fabricate components for assembly following approved shop drawings and/or manufacturer's standard installation instructions.
   D. After fabrication, clearly mark components to identify their locations in Project according to approved shop drawings.

2.6 Aluminum Finishes
   A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
   B. Factory Finishing:

PART 3 - EXECUTION

3.1 Examination
   A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
   B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Installation
   A. General:
      1. Comply with manufacturer's written instructions. Refer to installation instructions of the compatible curtain wall or storefront system.
      2. Please note that the installation instructions can differ from one compatible system to another.
      3. Do not install damaged components.
      4. Fit joints to produce hairline joints free of burrs and distortion.
      5. Rigidly secure non-movement joints.
      6. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
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8. Weld components in concealed locations to minimize distortion or discoloration of finish.  
   Protect glazing surfaces from welding.
9. Seal joints watertight where shown on approved shop drawings and/or manufacturer's  
   standard installation instructions.

B. Metal Protection:  
   1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting  
      contact surfaces with primer or by applying sealant or tape or installing nonconductive  
      spacers as recommended by manufacturer for this purpose.
   2. Where aluminum will contact concrete or masonry, protect against corrosion by painting  
      contact surfaces with bituminous paint.

C. Install components plumb and true in alignment with established lines and grades.

D. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action  
   at points of contact with other materials.

E. Install glazing as specified in Division 08 Section “Glazing”.

3.3 Adjusting, Cleaning and Protection

A. Protection: Protect installed product’s finish surfaces from damage during construction. Protect  
   aluminum sunshade system from damage from grinding and polishing compounds, plaster, lime,  
   cement, acid and/or acid wash, or other harmful contaminants.

B. Cleaning: Repair or replace damaged installed products. Clean installed products in accordance  
   with manufacturer’s instructions prior to owner’s acceptance. Remove construction debris from  
   project site and legally dispose of debris.

C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during  
   construction period.

END OF SECTION 107113
SECTI0N 129300 – SITE FURNISHINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Add Alternate 3: Sculptural Bench.
   2. Add Alternate 2: Bench.
   3. Add Alternate 2: Table.

B. Related Sections
   1. Division 2 Section “Earthwork”.
   2. Division 2 Section “Tree Protection and Trimming”.
   3. Division 2 Section “Site Concrete”.
   4. Section 321816 Playground Protective Surfacing.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated, including finish and color information.

B. Maintenance Data: For site furnishings to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of site furnishing(s) through one source from a single manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Anchors, Fasteners, Fittings, and Hardware: Provide Stainless steel; commercial quality, tamperproof, vandal and theft resistant unless indicated otherwise on the Drawings.

B. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107; recommended in writing by manufacturer, for exterior applications.

C. Erosion-Resistant Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with potable water at Project site to create pourable anchoring, patching, and grouting compound; resistant to erosion from water exposure without needing protection by a sealer or waterproof coating; recommended in writing by manufacturer, for exterior applications.
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2.2 SCULPTURAL BENCH

A. Provide furnishings manufactured by Landscape Forms, [http://www.landscapeforms.com](http://www.landscapeforms.com), or approved equal.
   1. Model: Lungo Mare, Module B, Color Gray.

2.3 BENCH

A. Provide furnishings manufactured by Landscape Forms, [http://www.landscapeforms.com](http://www.landscapeforms.com), or approved equal.
   1. Model: Parallel 42, Left, Right, and Straight Units as shown on Drawings, Surface Mounted, Color TBD.

2.4 TABLE

A. Provide furnishings manufactured by Landscape Forms, [http://www.landscapeforms.com](http://www.landscapeforms.com), or approved equal.
   1. Model: Harpo, 69”, Color TBD.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Landscape Architect and Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance.
   1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.

B. Unless otherwise indicated, install site furnishings after landscaping and paving have been completed.

C. Install site furnishings level, plumb, true, and securely anchored and positioned at locations indicated on Drawings. Obtain approval in the field by Landscape Architect prior to securing furnishings in place. Do not anchor furnishings without approval from Landscape Architect.

3.3 CLEANING AND PROTECTION

A. After completing site furnishing installation, inspect components. Remove spots, dirt, and debris. Repair damaged finishes to match original finish or replace component.

B. Protect finishes of furnishings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

END OF SECTION
SECTION 221423 - STORM DRAINAGE SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
   A. Section Includes:
      1. Reversible frame and grate.

1.3 ACTION SUBMITTALS
   A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 METAL DRAIN
   A. Reversible Roof Drain:
      1. Manufacturers: Subject to compliance with requirements, provide products by Neenah Enterprises, 2121 Brooks Ave., Neenah, WI 54956, 800-558-5075, www.nfco.com, or approved equal.
      2. Material: R-1879-AIG, Grate Type A. 12”x12” Grate with 18”x18” Base, Square Reversible Frame and Grate Assembly.

PART 3 - EXECUTION

3.1 INSTALLATION
   A. Install drains as shown on Drawings.

3.2 PROTECTION
   A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.

END OF SECTION 221423
SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Preparing subgrades for pavements and plants.
2. Excavating and backfilling for buildings and structures.
3. Drainage course for concrete slabs-on-grade.
4. Subbase course for concrete pavements.

B. Related Sections:

1. Section 015639 "Temporary Tree and Plant Protection".
2. Section 329300 "Plants" for finish grading in planting areas and tree and shrub pit excavation and planting.

1.3 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

D. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

E. Excavation: Removal of material encountered above subgrade elevations.

F. Fill: Soil materials used to raise existing grades.

G. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
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H. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.  

I. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.  

1.4 PROJECT CONDITIONS  

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth moving operations.  

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.  
2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.  

B. Utility Locator Service: Notify Call Before You Dig/One Call New Jersey for area where Project is located before beginning earth moving operations.  

C. Do not commence earth moving operations until plant-protection measures specified in Section 015639 "Temporary Tree and Plant Protection" are in place.  

D. The following practices are prohibited within protection zones:  

1. Storage of construction materials, debris, or excavated material.  
2. Parking vehicles or equipment.  
3. Foot traffic.  
4. Erection of sheds or structures.  
5. Impoundment of water.  
6. Excavation or other digging unless otherwise indicated.  
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.  

E. Do not direct vehicle or equipment exhaust towards protection zones.  

F. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.  

PART 2 - PRODUCTS  

2.1 SOIL MATERIALS  

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.  

B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487, Groups A-1, A-2-4, A-2-5, and A-3 according to AASHTO M 145, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7 according to AASHTO M 145, or a combination of these groups.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.

E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.

F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.

G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.

H. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.

I. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch (25-mm) sieve and 0 to 5 percent passing a No. 4 (4.75-mm) sieve.

J. Sand: ASTM C 33; fine aggregate.

K. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.

B. Protect and maintain erosion and sedimentation controls during earth moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.
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3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
   1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
   1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.4 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.5 STORAGE OF SOIL MATERIALS

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

3.6 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:
   1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
   2. Surveying locations of underground utilities for Record Documents.
   3. Testing and inspecting underground utilities.
   4. Removing concrete formwork.
   5. Removing trash and debris.
   6. Removing temporary shoring and bracing, and sheeting.
   7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
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B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.7 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use satisfactory soil material.
3. Under steps and ramps, use engineered fill.
4. Under building slabs, use engineered fill.
5. Under footings and foundations, use engineered fill.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.8 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.9 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 6 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches (100 mm) in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698, ASTM D 1557:

1. Under structures, building slabs, steps, and pavements, scarify and recompress top 12 inches (300 mm) of existing subgrade and each layer of backfill or fill soil material at 95 percent.
2. Under walkways, scarify and recompress top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill soil material at 92 percent.
3. Under turf or unpaved areas, scarify and recompress top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill soil material at 85 percent.
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3.10 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch (25 mm).
2. Pavements: Plus or minus 1/2 inch (13 mm).

3.11 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:

1. Install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
2. Place base course material over subbase course under hot-mix asphalt pavement.
3. Shape subbase course and base course to required crown elevations and cross-slope grades.
4. Place subbase course and base course 6 inches (150 mm) or less in compacted thickness in a single layer.
5. Place subbase course and base course that exceeds 6 inches (150 mm) in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick.
6. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 698, ASTM D 1557.

3.12 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

A. Place drainage course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:

1. Install subdrainage geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
2. Place drainage course 6 inches (150 mm) or less in compacted thickness in a single layer.
3. Place drainage course that exceeds 6 inches (150 mm) in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick.
4. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.13 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.14 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

B. Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Architect.

1. Remove waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 312000
SECTION 321313 - CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
   A. Section Includes:
      1. Concrete Paving
   B. Related Sections:
      1. Section 033000 “Cast-in-Place Concrete” for general building applications of concrete.

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

1.4 ACTION SUBMITTALS
   A. Product Data: For each type of product indicated.
   B. Other Action Submittals:
      1. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.5 INFORMATIONAL SUBMITTALS
   A. Qualification Data: For qualified ready-mix concrete manufacturer and testing agency.
   B. Material Certificates: For the following, from manufacturer:
      1. Cementitious materials.
      2. Admixtures.
      3. Curing compounds.
      5. Joint fillers.
C. Field quality-control reports.

1.6 QUALITY ASSURANCE

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

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" (Quality Control Manual - Section 3, "Plant Certification Checklist").

B. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

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

C. Concrete Testing Service: Engage a qualified testing agency to perform material evaluation tests and to design concrete mixtures.

D. ACI Publications: Comply with ACI 301 (ACI 301M) unless otherwise indicated.

PART 2 - PRODUCTS

2.1 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.

1. Use flexible or uniformly curved forms for curves with a radius of 100 feet (30.5 m) or less. Do not use notched and bent forms.

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

2.2 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:

1. Portland Cement: ASTM C 150, gray portland cement Type I:
   a. Fly Ash: ASTM C 618, Class F.
   b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

B. Regional Material for Concrete: Material sourced (extracted, manufactured, and purchased) within 100 miles of the project site not less than 10 percent.

C. Normal-Weight Aggregates: ASTM C 33, Class 4S, uniformly graded. Provide aggregates from a single source.
   1. Maximum Coarse-Aggregate Size: 3/4 inch (19 mm) nominal.
   2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

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


F. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
   1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
   2. Retarding Admixture: ASTM C 494/C 494M, Type B.
   3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
   4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
   5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
   6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

G. Use paving materials with a three-year aged solar reflectance (SR) value of at least 0.28. If three-year aged value information is not available, use materials with an initial SR of at least 0.33 at installation.

2.3 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) dry.

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

C. Water: Potable.

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

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
2.4 RELATED MATERIALS


2.5 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301 (ACI 301M), for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.

1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.

B. Proportion mixtures to provide normal-weight concrete with the following properties:

2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45
3. Slump Limit: 3 inches (100 mm).

C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:

1. Air Content: 6 percent plus or minus 1.5 percent for 3/4-inch (19-mm) nominal maximum aggregate size.

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

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

1. Use water-reducing admixture and retarding admixture in concrete as required for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

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

1. Fly Ash or Pozzolan: 25 percent.

G. Synthetic Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 1.0 lb/cu. yd. (0.60 kg/cu. m).

2.6 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.
1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For concrete batches of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For concrete batches larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

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

3.2 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 JOINTS

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

1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.
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B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.

1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.
2. Provide tie bars at sides of paving strips where indicated.
3. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys unless otherwise indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
4. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.

1. Locate expansion joints at intervals shown on Drawings.
2. Extend joint fillers full width and depth of joint.
3. Terminate joint filler not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished surface if joint sealant is indicated.
4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
6. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

D. Control Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows, to match jointing of existing adjacent concrete paving:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 3/8-inch (10-mm) radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate grooving-tool marks on concrete surfaces.
   a. Tolerance: Ensure that grooved joints are within 3 inches (75 mm) either way from centers of dowels.
2. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.

E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 3/8-inch (10-mm) radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.
3.5 CONCRETE PLACEMENT

A. Before placing concrete, inspect and complete formwork installation and items to be embedded or cast-in.

B. Remove snow, ice, or frost from subbase surface before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

D. Comply with ACI 301 (ACI 301M) requirements for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.

F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

G. Consolidate concrete according to ACI 301 (ACI 301M) by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
   1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating joint devices.

H. Screed paving surface with a straightedge and strike off.

I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

J. Cold-Weather Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:
   1. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
   2. Do not use frozen materials or materials containing ice or snow.
   3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.

K. Hot-Weather Placement: Comply with ACI 301 (ACI 301M) and as follows when hot-weather conditions exist:
1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms[, steel reinforcement,] and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.6 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
   1. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

3.7 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.

D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound or a combination of these as follows:
   1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
      a. Water.
      b. Continuous water-fog spray.
      c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
   2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches
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(300 mm) and sealed by waterproof tape or adhesive. Immediately repair any holes or
tears occurring during installation or curing period using cover material and waterproof
tape.

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

3.8 PAVING TOLERANCES

A. Comply with tolerances in ACI 117 and as follows:

1. Elevation: 1/2 inch
2. Thickness: Plus 3/8 inch (10 mm), minus 1/4 inch (6 mm).
3. Surface: Gap below 10-foot- (3-m-) long, unlevelled straightedge not to exceed 1/2 inch
(13 mm).
4. Joint Spacing: 3 inches (75 mm).
5. Contraction Joint Depth: Plus 1/4 inch (6 mm), no minus.
6. Joint Width: Plus 1/8 inch (3 mm), no minus.

3.9 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

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

1. Testing Frequency: Obtain at least one composite sample for each [100 cu. yd. (76
cu. m)] [5000 sq. ft. (465 sq. m)] or fraction thereof of each concrete mixture placed each
day.

   a. When frequency of testing will provide fewer than five compressive-strength tests
      for each concrete mixture, testing shall be conducted from at least five randomly
      selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample,
   but not less than one test for each day's pour of each concrete mixture. Perform
   additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not
   less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is
   40 deg F (4.4 deg C) and below and when it is 80 deg F (27 deg C) and above, and one
   test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of
   three standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and
two specimens at 28 days.
a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.

C. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).

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

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

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.

G. Concrete paving will be considered defective if it does not pass tests and inspections.

H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

I. Prepare test and inspection reports.

3.10 REPAIRS AND PROTECTION

A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.

B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving with epoxy adhesive.

C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 321313
PART 1 – GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this Section.

1.2 SECTION INCLUDES
A. Extent of work is shown on Drawings and includes but is not limited to:
   1. Concrete unit pavers.
   7. Mortar setting bed.
   8. Compacted aggregate subbase.
   9. Ornamental aggregate band at building.
   10. Edge restraint for ornamental aggregate band at building.

1.3 RELATED SECTIONS
A. Section 044800 – Site Stone Masonry

1.4 REFERENCES
A. The following apply to work in this Section:
      Modifications specified herein shall govern where conflicts with ASTM standards occur.

1.5 SUBMITTALS
A. Submit prior to delivery of materials to site.
B. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.
C. Samples for Initial Selection
   1. Submit one (1) unit paver sample of each color specified for final color selection.
D. Samples for Verification
   1. Setting Bed Materials
   2. Jointing Materials
   3. Filter Fabric: 12 inch square
E. Sieve Analysis: For aggregate setting-bed materials and jointing materials, according to ASTM C 136.

1.6 QUALITY ASSURANCE
A. Comply with governing codes and regulations. Provide products of acceptable manufacturers that have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.
B. Construction Tolerance:
   1. Concrete Unit Pavement: as per Manufacturer’s recommendations.
C. Field-Constructed Mock-ups: Provide sample panel of concrete unit pavers as specified herein. Build mock-ups in place at the sites and obtain University’s and Landscape Architect's acceptance of visual qualities of sample panels before commencing work. Replace unsatisfactory mock-up work until acceptance is obtained. Mock-up may be used as part of the work if conforming to specified requirements and accepted by Landscape Architect and University. Accepted mock-up establishes minimum standard of quality and workmanship for paver work.
1. Build 5’ x 5’ panel of the concrete unit pavement using pavers, setting and jointing materials and edge paver on mortar.
2. If initial mock-ups are rejected, build additional mock-ups to arrive at desired features. Retain all mock-ups until acceptable mock-up is selected by University and Landscape Architect. Retain and protect acceptable mock-ups during construction as standard for judging work. Do not alter, move, damage or destroy mock-up until work is complete.
3. Acceptable mock-ups may become part of the permanent installation.

1.7 DELIVERY STORAGE AND HANDLING

A. Deliver, store, handle and protect all materials from damage.
B. Handle pavers to prevent chipping, breakage, soiling, or other damage.
C. Store pavers on wood skids or pallets, covered with non-staining, waterproof membrane. Place and stack skids and pavers to distribute weight evenly and to prevent breakage and cracking.
D. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
E. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
F. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.

PART 2 – PRODUCTS

2.1 UNIT PAVERS

A. Concrete Unit Pavers: Hanover Architectural Products, 5000 Hanover Rd., Hanover, PA, 17331, 717-637-0500, www.hanoverpavers.com, or approved equal.
1. Plankstone Prest Brick Paver, 2 7/8”x24”x4”deep and 2 7/8”x18”x4”deep as shown on Drawings.
3. Finish: Natural.

2.2 SETTING AND JOINTING MATERIALS

A. Aggregate Subbase Course for paving on new base: Modified No. 2A coarse aggregate; pit run, natural stone, free of shale, clay, friable material, sand, and debris; graded in accordance with ASTM C136.

B. Aggregate for filling drilled holes: clean, crushed stone, AASHTO #8 or #9 aggregate, clean gray as available from Pyramid Materials, Media PA or approved equal.

C. Sand-Cement setting bed: 5:1 mix of sand: cement. Sand shall be clean, washed, well-graded sand free of deleterious materials, conforming to ASTM C-33.
D. Sand-Cement jointing material: 5:1 mix of sand: cement. Sand shall be clean, washed, well graded sand free of deleterious materials, conforming to ASTM C144.

2.3 MORTAR MATERIALS

A. Regional Materials: Provide aggregate for mortar and grout, cement, and lime that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.

B. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

C. Hydrated Lime: ASTM C 207, Type S.

D. Aggregate for Mortar: ASTM C 144.
   a. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

E. Mortar Pigments: Natural and synthetic iron oxides. Use pigments with a record of satisfactory performance in mortar. Pigments shall contain no carbon black.

F. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

2.4 MORTAR MIXES

A. General: Do not add mixtures including coloring pigments, air-entraining agents, accelerators, retarders, water repellent agents, anti-freeze compounds, or calcium chloride, unless otherwise indicated or previously approved by Landscape Architect.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide Type S unless another type is indicated.

D. Water: Potable, clean and free from deleterious acids, alkalis, and organic matter.

E. Mixing: Combine and thoroughly mix pre-blended dry materials to water in a mechanical batch mixer; comply with ASTM C270 proportion specification and manufacturer’s instructions for mixing time and water content, unless otherwise indicated.

2.5 EDGE RESTRAINTS FOR ORNAMENTAL STONE BAND

A. PerfEdge 16 GA, black powder coated steel edge restraints, straight sections, as available from Coyote Landscape Products, 800-321-1115 or approved equal.
   1. Provide stakes as required.
   2. Provide touch-up paint as required.

2.6 GEOTEXTILES

A. Separation Geotextile - Nonwoven: TenCate Mirafi 140N, or approved equal.
2.7 ORNAMENTAL AGGREGATE
   A. 1/2”-3/4” Delaware River Jacks in gray, buff, and red colors. Final color and size selection to be approved by Owner.

PART 3 – EXECUTION

3.1 EXAMINATION
   A. Verify that site conditions are ready to receive work of this section.
   B. Proceed with installation only after unsatisfactory conditions have been corrected.
   C. Beginning installation means acceptance of existing conditions.

3.2 PREPARATION
   A. Establish lines and levels.

3.3 MORTAR SETTING-BED APPLICATION AS EDGE RESTRAINT
   A. Saturate concrete subbase with clean water several hours before placing setting bed. Remove surface water about one hour before placing setting bed.
   B. Mix and place only that amount of mortar bed that can be covered with pavers before initial set. Before placing pavers, cut back, bevel edge, and remove and discard setting-bed material that has reached initial set.
   C. Place pavers before initial set of cement occurs. Immediately before placing pavers on mortar bed, apply uniform 1/16-inch-thick bond coat to mortar bed or to back of each paver with a flat trowel.
   D. Tamp or beat pavers with a wooden block or rubber mallet to obtain full contact with setting bed and to bring finished surfaces within indicated tolerances. Set each paver or step in a single operation before initial set of mortar; do not return to areas already set or disturb pavers or steps for purposes of realigning finished surfaces or adjusting joints.

3.3 INSTALLATION OF CONCRETE UNIT PAVERS
   A. Install aggregate subbase and concrete, or prepare existing concrete base as shown on Drawings and install geotextile as shown on Drawings. Wrap geotextile to prevent sand migration.
   B. Spread setting bed evenly. Dampen and compact with roller to achieve the proper depth indicated on Drawings and a level surface.
   C. Lay pavers in patterns as shown on Drawings.
   D. Install pavers.
      1. Maintain proper joint alignment and pattern as indicated on Drawings.
      2. Protect newly laid pavers with plywood panels placed over pavers where installers stand.
      3. Cut pavers as required and as shown on Drawings.
      4. Do not use unit pavers with chips, cracks, voids, discoloration or other defects which might be visible or cause staining in finished work.
UNIT PAVING

5. Cut unit pavers with motor-driven saw equipment to provide clean, sharp edges without chips. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting, except where field conditions dictate otherwise.

6. Place pavers by hand in straight courses with hand tight joints and uniform top surface. Keep good alignment and adhere to the pattern indicated on Drawings.

7. Do not exceed 3/16-inch joint between unit pavers.

8. After all unit pavers are installed, sweep with sand-cement until joints are completely filled. Mist paving lightly with water and sweep again.

9. Leave a small amount of excess sand on the pavers.

E. Do not allow traffic on installed pavers until jointing material has been installed.

F. Repeat joint-filling process 30 days later.

G. Remove and replace pavers that are loose, out of line or grade, chipped, broken, stained or otherwise damaged or if units do not match adjoining units as intended or present a tripping hazard. Provide new units and install in same manner as original units, with same joint treatment to eliminate evidence of replacement.

3.4 INSTALLATION OF EDGE RESTRAINT FOR ORNAMENTAL STONE BAND

A. Install edge restraint according to Manufacturer’s instructions. Ensure that the edging is positioned to allow the maximum number of spiral stakes.

B. Ensure that aggregate below existing concrete extends under edge restraint to a sufficient dimension so to allow the spiral stakes to be driven into the aggregate.

3.5 PROTECTION OF FINISHED WORK

A. Do not permit construction traffic over unprotected paver surface.

3.6 CLEAN UP

A. Maintain the site in an orderly condition during the progress of work. Promptly remove debris and trash. Leave the site in a neat, orderly condition, broom clean.

END OF SECTION
PART 1 - GENERAL

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

1.2 SUMMARY
   A. Section Includes:
      1. Synthetic turf.
   B. Related Sections:
      1. Division 32 Section "Site Concrete" for cast-in-place concrete curbs serving as
         edge restraint.

1.3 REFERENCES
   A. The following apply to work in this Section:
      1. ASTM: Specifications of the American Society for Testing and Materials latest
         editions. Modifications specified herein shall govern where conflicts with
         ASTM standards occur.

1.4 PERFORMANCE REQUIREMENTS

1.5 SUBMITTALS
   A. Certifications:
      1. Safety surface installation: Written statement from Manufacturer's
         Representative observing installation and certifying that safety surface was
         installed according to manufacturer's specifications.
   B. Product Data: For each type of product indicated.
      1. Artificial Playground Grass.
   C. Samples for Verification: For each type of playground surface system indicated.
      1. Minimum 6-by-6-inch Sample of artificial playground grass.
   D. Qualification Data: For qualified Installer.
E. Product Test Reports: Submit test reports in accordance with ASTM F 1292-93 if requested by Owner.

F. Field quality-control reports.

G. Maintenance Data: For playground surface system to include in maintenance manuals.

H. Warranty: Sample of warranty.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A company specializing in the manufacture of products specified in this Section with minimum of three (3) years experience.

B. Installer Qualifications: Contractor shall have had experience with at least two (2) other projects of similar scope and complexity and shall perform work with personnel totally familiar with playground safety surface installation and construction techniques under the supervision of an experienced foreperson.

C. Source Limitations: Obtain playground surface system materials from single source from single manufacturer.
   1. Provide secondary materials including geotextiles and repair materials of type and from source recommended by manufacturer of playground surface system materials.

1.7 REGULATORY REQUIREMENTS

A. Comply with all rules, regulations, laws and ordinances of local, state and federal authorities having jurisdiction. Provide labor, materials, equipment and services necessary to make work comply with such requirements without additional cost to Owner.
   1. Coordinate work with utility companies. Notify NJ One Call System, Inc. not less than three working days prior to beginning work.

B. Investigate the conditions of public thoroughfares and roads as to availability, clearances, loads, limits, restrictions and other limitations affecting transportation to and ingress and egress at the site.
   1. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction.

C. Conform to applicable code for disposal of debris.

D. Procure and pay for permits and licenses required for work.
PART 2 - PRODUCTS

2.1 ARTIFICIAL PLAYGROUND GRASS
   A. Surface System: Artificial Playground Grass.
      1. Products: Subject to compliance with requirements, provide artificial turf
         manufactured by Forever Lawn of South Jersey, 1214 Ellis Mill Rd., Mullica
         Hill, NJ 08062, 856-612-5343, or approved equal.
         a. Product Name: Select VR.

2.2 ARTIFICIAL PLAYGROUND GRASS ACCESSORIES
   A. Infill: Rubber infill installed per manufacturer’s recommendations.

PART 3 - EXECUTION

3.1 EXAMINATION
   A. Examine structural slab, with Installer present, for compliance with requirements for
      waterproofing, drainage, and other conditions affecting performance of the Work.
   B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF ARTIFICIAL PLAYGROUND GRASS SYSTEMS
   A. Artificial Playground Grass: Place artificial playground grass on top of concrete.
      Adhere with construction adhesive at edges.

3.3 CLEAN UP
   A. Maintain the site in an orderly condition during the progress of work. Promptly remove
      debris and trash. Leave the site in a neat, orderly condition, broom clean.

END OF SECTION
SECTION 02810 - IRRIGATION SYSTEMS

PART 1 - GENERAL

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

1.2 SUMMARY
   1. Verify existing and new utility locations.
   2. Design and furnish expansion of existing automatic irrigation system where indicated in Drawings, including obtaining all required permits.
   3. Furnish and install irrigation system.
   4. Layout and stake, trench, install piping, valves as well as other necessary appurtenances to provide complete, operational irrigation system.
   5. Check, start-up, adjust and demonstrate operation and winterization of system.
   6. Provide maintenance and adjustments for one (1) season of operation.
   7. Warranty and Guarantee.

1.3 Related Sections include the following:
   1. Division 2 Section “Earthwork”.
   2. Division 2 Section “Soil Preparation”.
   3. Division 2 Section “Exterior Plants”.

1.4 DEFINITIONS
   A. Lateral Lines: Downstream from control valves to sprinklers, specialties, and drain valves. Piping is under pressure during flow.
   B. Drain Piping: Downstream from lateral-lines drain valves. Piping is not under pressure.
   C. Main Piping: Downstream from point of connection to water distribution piping to, and including, control valves. Piping is under water-distribution-system pressure.
   D. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.

1.5 PERFORMANCE REQUIREMENTS
   A. Irrigation zone control shall be automatic operation with controller and automatic control valves.
   B. Location of Sprinklers and Specialties: Design location as shown on Drawings. Make minor adjustments necessary to avoid plantings and obstructions such as signs and light standards. Maintain 100 percent irrigation coverage of areas indicated.

1.6 SUBMITTALS
   A. Product Data: Submit manufacturer's technical product data and catalogue cuts or equipment data for all of the required components.
B. Shop Drawings: Provide layout drawings of proposed system for review by Landscape Architect and Owner.

C. Record drawings: At project closeout, submit as-built record drawings of installed irrigation system piping and products, in accordance with Division 1 requirements.

D. Maintenance Data: Submit maintenance program, data and parts list for irrigation system materials and products. Include these data, product data, shop drawings and record drawings in maintenance manual, in accordance with Division 1 requirements.

E. Operation and Maintenance Manual: Including, but not limited to:
   1. All equipment data, parts specification and manual sheets.
   2. Start-up procedures.
   3. Routine maintenance requirements and typical system adjustment needs.
   4. Winterization procedures.
   5. Controller program, soil moisture sensor and rain/freeze sensor settings.
   6. Terms and conditions of guarantee on labor and of warranty on products.
   7. Record Drawings: As-built record drawings of installed irrigation system piping and electrical conduit. Provide two (2) full size hard copy sets and one (1) digital record in PDF format.

F. Qualification Data: For qualified Installer.

G. Controller Timing Schedule: Indicate timing settings for each automatic controller zone.

1.7 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in manufacturing irrigation systems materials and products, of types and sizes required, whose products have been in satisfactory use in similar service for not less than five (5) years.

B. Installer's Qualifications: Contractor shall have had experience with at least five (5) other projects of similar scope and complexity and shall perform work with personnel totally familiar with irrigation systems and construction techniques under the supervision of an experienced foreperson.

C. Applicable requirements of current editions of accepted Standards, Codes and trade practices apply to work of this Section, including, but not limited to:
   1. American Society of Testing and Materials (ASTM)
   2. National Plumbing Code
   3. National Electrical Code (NEC)

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.9 PROJECT CONDITIONS

A. Coordinate installation of irrigation system with storm drainage systems, cistern, underground raceways for electrical systems, concrete paving, stone masonry, planting soil mixes, and planting.

B. Protect existing and new construction conditions adjacent to and within the limit of work.
1. All necessary precautions for safety including barricades and other protection measures shall be taken during all work.
2. All heavy equipment shall be driven or parked on the site only where approved by Landscape Architect.
3. Elements damaged or disturbed during construction including but not limited to existing pavements, structures, walls, planting soil, planting, and utility lines (above and below grade) shall be repaired or replaced to the satisfaction of the Owner at the cost of the Contractor.
4. Repair and replace all active utility lines, above and below grade, damaged in the course of construction operations.

C. Drawings shall be verified in field. Any discrepancies must be brought to the attention of the Landscape Architect prior to proceeding with work.

1.10 SEQUENCING AND SCHEDULING
A. Coordinate work in this Section with work of all other Sections of the Project Manual.

1.11 GUARANTEE
A. Guarantee work for two (2) years from date of acceptance against all defects in material, equipment and workmanship. Repairs, if required, shall be done promptly. Additional work effected by irrigation defects including but not limited to utilities, planting soil, planting, site stonework, and concrete paving shall be the financial responsibility of the Contractor.
B. Guarantee shall include spring start-up and winterizing of system within the two (2) year time and development of approved water application schedule. Winter damage due to improper winterization is the responsibility of the Contractor.
C. All repairs and servicing required shall be made under the observation of the Owner’s maintenance staff. The Contractor shall include training to Owner staff at these times.

PART 2 - PRODUCTS

2.1 GENERAL
A. Provide new piping materials and factory-fabricated piping products of sizes, types, pressure ratings and capacities as required to install a heavy duty best commercial irrigation system.
B. Selected contractor is responsible for the design of the irrigation system. Landscape Architect and Owner will review submittals and provide information as necessary to assist Contractor in development of system.
C. All work shall be in compliance with applicable codes and regulations. The Contractor is responsible to obtain required permits and coordination of inspections.

2.2 PIPE
A. Polyvinyl Chloride (PVC): Pipe over 1-inch diameter shall conform to ASTM D2241, SDR 21, and Class 200.
B. Polyvinyl Chloride (PVC): Pipe over 1-inch diameter shall conform to ASTM D2241, SDR 26, and Class 160.
C. Polyvinyl Chloride (PVC): Electrical conduit shall be Schedule 40 gray PVC and conform to UL 651 and NEMA TC2.
D. Flexible Polyethylene (PE) Lateral Line Fittings: Fittings shall conform to ASTM D2609, Type 1 PVC insert fittings designed for use with this type of pipe. Pipe and fittings shall be joined with stainless steel pinch clamps or worm gear clamps, including stainless steel screw.

E. Joints: Pipe sizes 2-1/2-inch and smaller shall have bell and socket joints.

F. Pipe sizes larger that 2-1/2-inch shall have snap connections with rubber gasket joints.

2.3 ACCESSORIES

A. Sleeves: Sleeves for pipes passing beneath paving shall conform to ASTM D2241. Minimum diameter of 2 inch or 2 sizes larger than pipe scheduled to pass through them.

B. PVC Solvent Cement: Cement shall conform to ASTM D2564.

C. Swing Pipe Connections:
   1. Connections between spray-type heads and laterals shall be flexible black tubing constructed of linear low-density polyethylene material. The tubing shall have a wall thickness of 0.098 inches. It shall have a nominal inside diameter of 0.487 inches. Each 18-inch length of tubing shall be capable of pressure testing to 80 psi per second to a minimum burst pressure of 350 psi.
   2. The fittings used with the swing pipe tubing shall have male spiral-type barbs on one end and either male or female threaded ends opposite and shall be made of hard acetyl thermoplastic.

D. Swing Joint Connections:
   1. The swing joints shall be used as a height-adjustable connector between lateral lines and 3/4-inch, 1-inch and 1-1/2-inch sprinklers or quick coupler valves. The swing joint internal elbows shall have an enlarged cross-section and radial corners for superior flow characteristics that reduce pressure losses by at least 50% compared to other swing joints. The swing joint shall be molded from rigid PVC, Type 1, cell classification 1245-4-B, conforming to ASTM D1784, with a pressure rating of 315 psi at 73° F when tested in accordance with ASTM D3139, including 60 minutes at 790 psi, and short term exposure of 1000 psi without leakage. All NPT threads, sockets, and spigots shall be Schedule 80 per ASTM D2464 and D2467.
   2. All components shall be factory pre-assembled, available with 3/4-inch, 1-inch, and 1-1/2-inch inlet/outlet and in lengths of 12-inch and 18-inch. Spigot inlets shall be available for 1-inch swing joints. All rotating joints shall be modified stub ACME threads. All rotating joints shall have two EPDM rubber o-rings for positive sealing and thread protection. The swing joint shall have oversized threaded inlets with large grips and visible thread stops to make hand-tightening and blind (underwater) installations easier.
   3. The color of the 3/4-inch and 1-inch swing joints shall be white for easy identification when installed and the 1-1/2-inch swing joint shall be dark gray.

2.4 VALVE BOXES

A. Provide valve boxes at valve locations
   1. Basis of Design: Carson Industries 10” round valve box, or approved equal.
      a. Model: 910-12B (lock bolt)
      b. Color: Green
B. There shall be no hole in the valve box lid unless the bolt-hole knock-out is removed in order to use the locking bolt. Lids shall have beveled edges to minimize potential damage from lawn equipment lids shall be clearly marked with the words "Irrigation Control Valve" molded onto the top. Lids shall have a marking area measuring at least 6-inch by 2-inch that is suitable for branding or other means of identification.

C. No irrigation valve box shall be placed in or under pavement or hardscape.

2.5 VALVES

A. Standard Control Valve:
   1. Basis of Design: Rainbird PGA Series auto valves, or approved equal.

B. Size of the valve shall be the same as the main line pipe as noted on the drawings.

2.6 ISOLATION VALVES

A. Valve shall be manufactured out of brass and be pressure rated to 200 psi WOG non-shock. Valve shall have threaded bonnet, non-rising stem, brass cross handle and solid wedge disc. Valve shall be a Nibco Mfg. Co model T-113.

2.7 QUICK COUPLER VALVES

A. The valve body shall be of cast brass construction with a working pressure of 125 psi. The valve seat disc plunger body shall be spring loaded so that the valve is normally closed under all conditions when the key is not inserted.

B. The top of the valve body receiving the key shall be equipped with a single slot and smooth face to allow the key to open and close the valve slowly with a one-half turn. The quick coupling valve shall be equipped with a vinyl cover.

C. The valve body construction shall be such that the coupler seal washer may be removed from the top for cleaning or replacement without disassembling any other parts of the valve.

D. Keys shall be single lug with 1-inch male thread and 3/4-inch female thread at the top.

E. Contractor shall provide one key and one 1-inch x 1-inch swivel hose ell for every six quick couplers. Quick coupling valves, keys and swivels shall be manufactured by Rain Bird Corporation models 5RC, 55K-1 and SH-2.

2.8 ELECTRICAL REMOTE CONTROL VALVES

A. Standard Electrical Control Valve:
   1. The electric remote control valve shall be a normally closed 24 VAC 50/60 cycle solenoid actuated globe pattern design. The valve pressure rating shall not be less than 200 psi.

   2. The valve body and bonnet shall be constructed of heavy-duty glass-filled UV-resistant nylon and have stainless steel studs and flange nuts; diaphragm shall be of nylon reinforced nitrile rubber.

   3. The valve shall have both internal and external manual open/close control (internal and external bleed) to manually open and close the valve without electrically energizing the solenoid. The valve's internal bleed shall prevent flooding of the valve box.

   4. The valve shall house a fully-encapsulated, one-piece solenoid. The solenoid shall have a captured plunger with a removable retainer for easy servicing and a leverage handle for easy turning. This 24 VAC 50/60 Hz solenoid shall open with 19.6 volt minimum at 200
psi. At 24 VAC, average inrush current shall not exceed 0.41 amps. Average holding current shall not exceed 0.28 amps.

5. The valve shall have a brass flow control stem for accurate manual regulation and or shut-off of outlet flow. The valve must open or close in less than 1 minute at 200 psi and less than 30 seconds at 20 psi.

6. The valve construction shall be such as to provide for all internal parts to be removable from the top of the valve without disturbing the valve installation.

7. When so indicated the valve shall have a mechanical “scrubber” to clean the stainless steel intake screen for use in dirty water applications.

B. Pressure Regulating Option

1. When so indicated on the design, the 1-inch, 1-1/2-inch and 2-inch electric remote control plastic valves shall have a pressure-regulating module capable of regulating outlet pressure between 15 and 100 psi (+/-3 psi).

2. The pressure-regulating module shall have an adjusting screw for setting pressure and Schrader valve connection for monitoring pressure. The pressure shall be adjustable from the pressure-regulating module when the valve is internally manually bled or electrically activated.

3. The pressure-regulating module shall be Model PRS-D as manufactured by Rain Bird Corporation, Glendora, CA.

C. Provide watertight connectors as King One Step for wiring connections.

2.9 MASTER VALVES

A. Master valves shall be an electric remote control valve as specified herein.

B. Size of the valve shall be the same as the main line pipe as noted on the drawings.

C. Provide watertight connectors as King One Step for wiring connections.

2.10 HEADS

A. Full or Part Circle Pop-Up Fixed Spray Sprinkler or Bubblers as appropriate for area to be irrigated.

1. Basis of Design: Rainbird, or approved equal.
   a. Pop-up heights shall be determined by Contractor – water full plant bed without water on existing paving and site furnishings.
   b. The pop-up spray sprinkler shall include a Seal-A-Matic (SAM) check valve and a pressure regulating stem (PRS) device.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions under which irrigation system materials and products are to be installed. Locate, identify and protect existing and new below-grade utilities.

B. Make field measurements necessary for Work noting relationship of irrigation work to work of other trades. Coordinate with other trades.
1. Coordinate with Masonry Contractor as required for sleeving through site walls and under demolished paving.

C. Set stakes to identify locations of proposed irrigation system. Obtain Owner and Landscape Architect’s approval before excavation.

D. Notify Landscape Architect of any discrepancies between the Contract Documents and field conditions.

E. Protect plants, planter and building walls, slabs and structures, lighting, waterproofing, underdrainage etc., from damage due to work of this Section. Damage to work of another trade shall be reported immediately.

F. Pressure/Flow Test: Conduct tests at the irrigation water tap or meter location and provide written results to Owner including the following information:
   1. Static pressure in psi.
   2. Residual pressure in psi.
   3. Flow in gpm.

G. Prior to installation, receive approval from General Contractor to proceed with construction.

3.2 EXCAVATION, BACKFILL AND PIPE ASSEMBLY AND INSTALLATION

A. Excavate and trench to depths as determined during design process.

B. Install sleeves as required prior to installation of pavement and coordinated with installation of segmental retaining walls.

C. Backfilling to be done in accordance with Division 2 Section “Planting Soil Mixes”.

D. Trenching and Backfilling:
   1. Excavate trench to proper depth as shown or specified.
   2. Minimum trench width shall be 3 1/2 inches.
   3. Over excavate trenches deeper than required in soils containing rock or other hard material that might damage pipe and backfill to proper depth with selected fine earth or sand.
   4. Backfill and hand tamp over excavation prior to installing piping.
   5. Keep trenches free of obstructions and debris that would damage pipe.
   6. Sprinkler piping shall not be installed in same trench as heating ducts, electric ducts, storm and sanitary sewer lines, water and gas mains.

E. Location and Arrangement: Determine location and arrangement of piping systems. Install piping as indicated unless deviations are approved on Coordination Drawings.

F. Install piping at minimum uniform slope of 0.5 percent down toward drain valves.

G. Install piping free of sags and bends.
   1. Snake pipe in trench at least 1 foot per 100 feet of pipe to allow for thermal expansion.

H. Install groups of pipes parallel to each other, spaced to permit valve servicing.

I. Install fittings for changes in direction and branch connections.

J. Install expansion loops in control-valve boxes for plastic piping.

K. Lay piping on solid subbase, uniformly sloped without humps or depressions.

L. Install PVC piping in dry weather when temperature is above 40 deg F. Allow joints to cure at least 24 hours at temperatures above 40 deg F before testing.
M. Install piping in sleeves.

N. No pipe shall be laid when, in the opinion of the Owner, trench or weather conditions are unsuitable. When pipe laying is not in progress, open ends of installed pipe shall be closed by approved means to prevent entrance of trench water and other foreign material into the line. Enough backfill shall be placed in the center sections of the pipe to prevent floating. Any pipe that has floated shall be removed from trench and re-laid.

O. Record pipe and wire location(s) on record drawings.

3.3 JOINT CONSTRUCTION

A. Cut plastic pipe with hand saw or pipe-cutting tool and remove burrs at cut ends. Pipe cuts shall be square and true.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Threaded Joints: Threaded connections shall be made in accordance with pipe manufacturer's recommendations.

D. Flanged Joints: Select rubber gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

E. Make solvent-weld joints in accordance with manufacturer's recommendations relating to preparation, temperature, humidity, and cure-time. Pipe and fittings shall be thoroughly cleaned of dirt, dust and moisture before applying solvent.

3.4 VALVE INSTALLATION

A. Install manual shut-off valve and quick coupler valve at Point of Connection for winterization.

B. Valve wiring shall be laid in same trench, and at same invert, as mainline. Wires shall not be installed tautly. Splices shall be properly waterproofed with approved connector and shall occur only in valve boxes or splice boxes. There shall be no direct-buried splices between controller and valve box or splice box locations.

C. Install valves. Place no valves closer than six (6) inches to planter walls. Locate all valve boxes in planting beds. Provide minimum 4” gravel and filter fabric under valve boxes.

D. Install plumb to within 1/16 inch.

3.5 SPRINKLER INSTALLATION

A. Install lines and sprinklers in accordance with manufacturer's instructions.

B. Install sprinklers after hydrostatic test is completed.

C. Sprinkler heads shall be installed plumb to within 1/16 inch with top collar, not nozzle, flush with finished grade. Maintain 3" clearance from side of sprinkler cape to edge of nearest pavement or structure.

D. If directed, sprinkler shall be replumbed and reset to finish grade during guarantee period.

E. Locate part-circle sprinklers to maintain a minimum distance of 4 inches from walls and 2 inches from other boundaries unless otherwise indicated.
3.6 ELECTRICAL CONNECTIONS AND CONTROL WIRE
   A. Conform to National Electrical Code (NEC) and local electrical codes.
   B. Provide electrical connection to system as required.
   C. Expansion Loops: Construct by wrapping wire around 1/2-inch diameter pipe to create coil. A 3-foot section of wire shall be used to create 12-inch coil with 6-foot section being used to create 24-inch coil.
      1. Provide 12-inch coils at each wire splice, not including valves, and at each change of wire direction.
      2. Provide 24-inch coils at each control valve and where each valve enters conduit for automatic controller.
      3. Control wires to be placed in minimum 1-1/4-inch gray PVC electrical conduit from controller location to each valve box, terminating in each valve box with a long sweep 90 degree ell.

3.7 IDENTIFICATION
   A. Identify system components. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplates and signs on each automatic controller.
      1. Text: In addition to identifying unit, distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations.
   B. Warning Tapes: Arrange for installation of continuous, underground, detectable warning tapes over underground piping during backfilling of trenches. See Division 2 Section "Earthwork" for warning tapes.

3.8 FIELD QUALITY CONTROL
   A. Perform leak testing and test pressure. Locate and repair leaks, if any, and retest.
   B. Flush piping after piping, valves and sprinkler bodies are in place and connected, but prior to installation of internal sprinkler parts.
   C. Adjust sprinkler heads for optimal performance and to prevent overspray onto pavements and structures. There cannot be any overspray on buildings.
   D. Any irrigation product will be considered defective if it does not pass tests and inspections.
   E. Operational Test: After electrical circuitry has been energized, operate controllers and automatic control valves to confirm proper system operation. Replace damaged and malfunctioning controls and equipment.
   F. Prepare test and inspection reports.

3.9 CLEAN UP
   A. Maintain the site in an orderly condition during the progress of work. Promptly remove debris and trash. Leave the site in a neat, orderly condition, broom clean.

3.10 STARTUP SERVICE
   A. Perform startup service.
      1. Complete installation and startup checks according to manufacturer's written instructions.
2. Verify that controllers are installed and connected according to the Contract Documents.
3. Verify that electrical wiring installation complies with manufacturer's submittal.

3.11 ADJUSTING

A. Adjust settings of controllers.
B. Adjust automatic control valves to provide flow rate at rated operating pressure required for each sprinkler circuit.
C. Adjust sprinklers for optimal performance. Adjust pressure and spray pattern to minimize overspray to the greatest extent possible while maintaining full plant coverage.

3.12 MAINTENANCE DURING GUARANTEE PERIOD

A. General: Perform procedures set forth in the submitted and approved maintenance program for the duration of Guarantee Period.
   1. Filter shall be inspected monthly and cleaned as necessary and as per manufacturer's recommendations.
   2. Observe flushing operation of line flushing valves at beginning of each irrigation season to ensure proper flushing. Check pressure at the line flushing valves. Make repairs, as necessary, in accordance with manufacturer's recommendations.
   3. Inspect irrigation zone during operation. Look for excessively wet or dry areas. If a leak is found, repair in accordance with manufacturer's recommendations.
B. Winterize irrigation system in accordance with manufacturer's recommendations.

3.13 CLOSE OUT

A. Instruct the Owner's personnel in the proper operation and maintenance of the system.
B. At completion of walk through and instruction of Owner's personnel, Contractor shall insure that the following are complete.
   1. Permits required for this work are signed-off by appropriate parties and copies furnished to Owner.
   2. Maintenance and Operating Manuals and warranty cards are complete and delivered to Owner, including record drawings and other required items.

END OF SECTION
SECTION 329100 SOIL PREPARATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section

1.2 SECTION INCLUDES

A. Extent of work is shown on Drawings and includes but is not limited to:

1. Furnish, mix and install Planting Soil for plant beds.
2. Preparation of subgrade and finish grade and compaction mitigation.
3. Furnish and install compost for in-situ soil amendment.
4. Clean up.

1.3 RELATED REQUIREMENTS

A. Division 31 Section “Earthwork”.
B. Section 329300 – Plants.

1.4 REFERENCES

A. In the event that the requirements of any of the referenced standards and specifications herein conflict with each other the more stringent requirement shall prevail. Where reference is made to one of the standards, the revision in effect at the time of bid opening shall apply.

B. American Society for Testing Materials (ASTM):
1. ASTM C33 – Gradation Requirements for Coarse Aggregates.
5. ASTM D3385 – Standard Test Method for Infiltration Rate of Soils in Field Using Double-Ring Infiltrometer.
C. Other Standards:
   4. Environmental Protection Agency (EPA) Section 503 Regulations.
   5. U.S. Composting Council (USCC), Test Methods for the Examination of Composting and Compost (TMECC), current edition.

1.5 DEFINITIONS

A. Amendment: material added to Topsoil to produce Planting Soil Mix. Amendments are classified as general soil amendments, fertilizers, biological, and pH amendments.

B. Bulk Density: is an indicator of soil compaction calculated as the dry weight of soil by its volume typically expressed in g/cm³.

C. Coarse Sand: sharp natural or manufactured fine aggregate and further defined in this specification.

D. Compacted soil: soil where the density of the soil is greater that the threshold for root limiting, and further defined in this specification.

E. Compost: Well decomposed stable organic material as defined by the US Composting Council and further defined in this specification.

F. Debris: Elements including, but not limited to, concrete, concrete masonry, wood, excavated rock and rock fragments, rubble, overburden soils, abandoned utility structures, trash, refuse and litter.

G. Drainage: The process of water moving through the soil, transitioning the soil from dry to saturated to field capacity, the rate of which may be expressed as the saturated hydraulic conductivity rate (Ksat; units are inches per hour).

H. Existing Soil: Mineral soil existing at the locations of proposed planting after the majority of the construction within and around the planting site is completed and just prior to the start of work to prepare the planting area for soil modification and/or planting, and further defined in this specification.

I. Fertilizer: amendment used for the purpose of adjusting soil nutrient composition and balance.
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J. Fine grading: The final grading of the soil to achieve exact contours and positive drainage, often accomplished by hand rakes or drag rakes other suitable devices, and further defined in this specification, and further defined in this specification.

K. Finished grade: surface or elevation of Soil after final grading and 12 months of settlement of the soil, and further defined in this specification.

L. Planting Soil: Planting soil shall harvested from fields or development sites or manufactured uniformly mixed individual soil components (Topsoil, Sand, Compost) or existing mineral soil at the locations of proposed planting meeting the criteria specified herein.

M. Salvaged Topsoil: Stripped native loam removed within the limits of work, but outside of the “Tree Protection Areas”, to its entire natural depth.

N. Scarify: Loosening and roughening the surface of soil and sub soil prior to adding additional soil on top, and further defined in this specification.


P. Soil Tilling: Loosening the surface of the soil to the depths specified with a rotary tine tilling machine, roto tiller, (or spade tiller), and further defined in this specification.

Q. Subgrade: Surface or elevation of subsoil remaining after completing excavation or backfill immediately beneath Planting Soil.

R. Topsoil: Topsoil shall be a harvested from fields or development sites and shall be loose, friable mineral particles resulting from natural soil formation from the A, E and upper B horizons, or solum where most plant roots grow and as defined further herein.

1.6 SUBMITTALS

A. Submit references of past projects and employee training certifications that support that the Contractors meet all of the installer qualifications and applicable licensures specified herein.

B. Submit a list of materials to be provided for work under this Section including the name and address of the materials producer and the location from which the materials are to be obtained.

C. Submit dated certificates or letters, signed by the materials producer, stating that materials meet or exceed the specified requirements.

D. For each type of manufactured product, submit data and certificates that the product meets the specification requirements, signed by the product manufacturer, and complying with testing requirements and referenced standards and specific requested testing.

E. Laboratory soil testing requirements:
   1. Samples of soil(s) to be submitted to an approved soil testing laboratory for testing in accordance with specifications herein. Submit the soil testing laboratory for review and approval prior to commencing with any soil testing.
2. Test results shall be submitted to the Landscape Architect for approval in conjunction with soil amendment products in accordance with soil testing laboratory recommendations.

3. Submit soil test reports including test results for each criteria listed within the Products section herein for:
   c. Test reports for Individual Components and Soil Mixes must be submitted concurrently.
   d. The source of supply for Individual Components for Soil Mixes and Soil Mixes Using Individual Components must be indicated on the test report submittals.

4. Test reports must be the same material to be supplied and must be current within the period of time defined as follows:
   a. Topsoil: no more than 6 months old.
   b. Compost: no more than 3 months old.
   c. Sand: no more than 6 months old.
   d. Planting Soil: test data must be no more than 1 month old.
   e. Sample test results shall be considered valid until the time of construction and for the material supplied.

5. If tests fail to meet the specifications, obtain other sources of material, retest and resubmit until accepted by the Landscape Architect.

6. Soils shall not contain any traces of hydrocarbons, petroleum products, chemically prohibited substances, or any other elements considered to be toxic to any vegetation that is used. Clean fill certification shall be submitted by the manufacturer.

7. All soil testing will be at the expense of the Contractor.

F. Physical samples:
   1. All samples must be submitted simultaneously with the laboratory test reports. Samples are required for the following:
      a. Planting Soil.
      b. In-situ Soil Amendments: Compost.
   2. Provide one (1) one-gallon sample in a resealable plastic bag to the Landscape Architect.

G. In-situ (worksite) verification soil testing requirements:
   1. Compaction Testing:
      a. Maintain an up-to-date written report of compaction test results. Test compaction every 12-inch lift of soil for every 300 square feet of soil installed. THE LANDSCAPE ARCHITECT may review the written report at any time to confirm conformance with the specification. Submit final report at the completion of soil installation.
      b. Maintain at the site at all times a soil cone penetrometer with pressure dial and a soil moisture meter to check soil compaction and soil moisture.
         1) Penetrometer shall be AgraTronix Soil Compaction Meter or approved equal.
         2) Moisture meter shall be “general digital soil moisture meter”.
   2. Percolation Testing (Ksat):
      a. Upon completed installation of the full depth soil mix profile, perform a percolation test for every 1,000 square feet of the stormwater management practice area by one of the following methods as approved by the Landscape Architect.
SOIL PREPARATION

1) Double Ring Infiltrometer method per ASTM D3385, current edition.
2) Modified Philip Dunne (MPD) Infiltrometer method.

b. Maintain an up-to-date written report of percolation test results. The Landscape Architect may review the written report at any time to confirm conformance with the specification. Submit final report at the completion of soil installation.

3. Should any verification test results indicate soil material is not consistent with the approved submittals or requirements specified herein, the Contractor shall remove the installed soil and re-install soil at the Contractor’s expense until the Contract Document requirements are met.

H. Accompany each delivery of soil mixes, bulk materials, fertilizers and soil amendments provide the appropriate certificates and delivery tickets to the General Contractor for record. The soil supplier must be indicated on delivery tickets for all soil mix deliveries and the supplier must match the approved submittals.

1.7 QUALITY ASSURANCE

A. All materials, methods of construction, and workmanship shall conform to applicable requirements of ASTM, PTM, CT DOT Standard Specifications, CT DEEP, and AASHTO Standards, unless otherwise specified.

B. Soil Testing Laboratory Qualifications: The laboratory shall be an independent laboratory, recognized by the State Department of Agriculture. The testing laboratory must have experience in performing agronomic testing including physical and chemical properties of soil. Tests shall be made in strict compliance with the standards of the Association of Official Analytical Chemists and follow standards from the NRCS Soils Manual and ASTM testing methods applicable to the specific tests requested. Laboratory shall have staff fully qualified to review test results, and to make recommendations to amend samples based on what is planned to grow in the soil. American Association for Laboratory Accreditation (A2LA) certification is preferred.

1. Compost that participates in the US Composting Council’s Seal of Testing Assurance (STA) Program and tested through an STA program lab, using appropriate test methods from the TMECC (Test Methods for the Examination of Compost and Composting) is preferred. Test data shall be presented on a Compost Technical Data Sheet.

C. Any fill or topsoil sources, disposal areas, or temporary offsite storage locations shall be subject to review and approval by the code enforcement officials.

D. Installer Qualifications: The installer shall be a firm having at least five (5) years of experience of a scope similar to that required for the work.

1. Installer Field Supervision: When any soil work is in progress, installer shall maintain, on-site, an experienced full-time supervisor.

2. Installer’s field supervisor shall have a minimum of five (5) years experience as a field supervisor installing soil, shall be trained and proficient in the use of field surveying equipment to establish grades.

1.8 DELIVERY, STORAGE AND HANDLING

A. Preparation, amendment, and mixing of soils shall be performed at the soil supplier location.
B. Weather: Do not mix, deliver, place or grade soils when frozen or with moisture above field capacity. Soils shall not be handled, hauled, placed, or compacted when wet or frozen. Soil shall only be handled when the moisture content is between the specified ranges in percent water by volume.

C. Protect soil and soil stockpiles, including the stockpiles at the soil blender’s yard, from wind, rain and washing that can erode soil or separate fines and coarse material, and contamination by chemicals, dust and debris that may be detrimental to plants or soil drainage. Once spread, soils shall be protected with staked erosion control blankets.

D. All manufactured packaged products and material shall be delivered to the site in unopened containers and stored in a dry enclosed space suitable for the material and meeting all environmental regulations. Biological additives shall be protected from extreme cold and heat. All products shall be freshly manufactured and dated for the year in which the products are to be used.

E. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.

F. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.

PART 2 - PRODUCTS

2.01 INDIVIDUAL COMPONENTS FOR SOIL MIXES

B. TOPSOIL

1. Topsoil definition: Topsoil shall be a harvested from fields or development sites and shall be loose, friable mineral particles resulting from natural soil formation from the A, E and upper B horizons, or “solum” where most plant roots grow. Manufactured soils where sand, composted organic material, chemical additives or similar elements has been blended to meet the requirements of Topsoil is not acceptable. The soil shall be free of construction and trash debris, rocks, hydrocarbons, petroleum materials, herbicides, or other harmful contaminants that would impact plant growth.

2. Topsoil shall comply with the following parameters:
   c. Organic matter (ASTM F1647, Method A): 1.5% minimum (by dry weight).
   d. pH (1 soil : 1 water): 5.0 - 7.0.

3. Stockpiled Existing Topsoil at the site meeting the above criteria may be acceptable.

C. ORGANIC AMENDMENT / COMPOST

1. Compost is as defined by the “US Composting Council Landscape Architecture / Design Specifications for Compost Use, Planting Bed Establishment with Compost”. Compost shall be a well decomposed, stable, weed free organic matter source. It shall be derived from: agricultural, food, or industrial residuals; leaf litter and yard trimmings; or source-separated waste. The product shall contain no substances toxic to plants and shall be reasonably free (<1% by dry weight) of man-made foreign matter. The compost will possess no objectionable odors and shall not resemble the raw material from which it was derived.
2. Compost shall comply with the following parameters:
   b. Soluble salt content (electrical conductivity, 1 soil : 2 water): maximum 5 dS/m (mmhos/cm).
      1) Compost derived from stabilized mushroom soil compost may possess a maximum EC of 10 dS/m (1:2), if the maturity testing is a minimum of 95% and ammonia (NH4) content is a maximum of 250 ppm.
   c. Moisture content %, wet weight basis: 30 – 60.
   e. Particle size, dry weight basis: 98% pass through 1/2 inch screen.
   f. Stability carbon dioxide evolution rate: mg CO2-C/ g OM/ day ≤ 3.
   g. Maturity, seed emergence and seedling vigor, % relative to positive control: minimum 80%.
   h. Physical contaminants (inerts), %, dry weight basis: <0.5%.
   i. Chemical contaminants, mg/kg (ppm): meet or exceed US EPA Class A standard, 40CFR § 503.13, Tables 3 levels.
   j. Biological contaminants select pathogens fecal coliform bacteria, or salmonella, meet or exceed US EPA Class A standard, 40 CFR § 503.32(a) level requirements.

D. COARSE SAND

1. Sharp natural or manufactured fine aggregate shall be hard and durable and free of limestone (calcareous sand), shale and slate particles and free of harmful contaminants that would impact plant growth complying with the following parameters:
   a. pH shall be lower than 7.0.
   b. Sieve analysis:

<table>
<thead>
<tr>
<th>Sieve</th>
<th>Percent passing (by mass)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8 inch (9.5 mm)</td>
<td>100</td>
</tr>
<tr>
<td>No 4 (4.75 mm)</td>
<td>95-100</td>
</tr>
<tr>
<td>No 8 (2.36 mm)</td>
<td>80-100</td>
</tr>
<tr>
<td>No 16 (1.18 mm)</td>
<td>50-85</td>
</tr>
<tr>
<td>No 30 (.60 mm)</td>
<td>25-75</td>
</tr>
<tr>
<td>No 50 (.30 mm)</td>
<td>5-40</td>
</tr>
<tr>
<td>No 100 (.15 mm)</td>
<td>2-20</td>
</tr>
<tr>
<td>No 200 (0.75 mm)</td>
<td>2-15</td>
</tr>
</tbody>
</table>
   c. Particle analysis must be per USDA classification, Sand.
      Sand (2 - 0.05 mm): ≥88%
      Silt (0.05 - 0.002 mm): ≤9%
      Clay (< 0.002 mm): ≤3%

E. CHEMICAL AMENDMENTS

1. Lime, ASTM C 602, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent and as follows:
   a. Class: Class T, with a minimum 99 percent passing through No. 8 sieve and a minimum 75 percent passing through No. 60 sieve.
   b. Provide lime in form of dolomitic limestone.
A. DEFINITION

1. Manufactured uniformly mixed individual soil components (Topsoil, Sand, Compost) meeting the criteria specified herein. Provide Planting Soil at the locations indicated on the Drawings complying with the following parameters.

B. PLANTING SOIL

1. Planting soil shall be harvested from fields or development sites or manufactured uniformly mixed individual soil components (Topsoil, Sand, Compost) or existing mineral soil at the locations of proposed planting meeting the criteria specified herein.

2. Provide Planting Soil at the locations indicated on the Drawings complying with the following parameters:
   a. Particle analysis must be per USDA classification for loam, sandy loam, sandy clay loam, or silt loam within the following parameters using ASTM D422:
      - Sand: 45 - 55%
      - Silt: no more than 30%
      - Clay: no more than 20%
      - Gravel content larger than 2mm shall be less than 12%.
   d. Hydraulic conductivity (ASTM F1815) at 85% Proctor (ASTM D698): 1.0 - 3.0 in/hr
   e. Soluble salt content (electrical conductivity, 1 soil : 2 water): maximum 1.60 mmho/cm. Sodium (Na) salinity shall not exceed 700 ppm.
   f. Cation Exchange Capacity (CEC): >15 meq/100g.
   g. Nutrient analysis including macronutrients and micronutrients (Mehlich-3) with soil fertility interpretation and recommendations relevant to the specified plant species.
   h. Compost shall not be added at more than 20% by volume.

PART 3 - EXECUTION

3.1 SITE EXAMINATION

A. Prior to installation of Soil, examine site to confirm that existing conditions are satisfactory for the work of this section to proceed. The Landscape Architect shall approve the condition of the subgrade and the previously installed subgrade preparation and the installation of subsurface drainage.

1. Confirm that the subgrade is at the proper elevation and compacted as required. Subgrade elevations shall slope toward the under drain lines as shown on the drawings.
   a. Subgrade definition: surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing Planting Soil.

2. Confirm that all surface areas to be filled with Soil are free of construction debris, refuse, compressible or biodegradable materials, stones greater than 2 inches diameter, soil crusting films of silt or clay that reduces or stops drainage from the Soil into the subsoil; and/or standing water. Remove unsuitable material from the site.
   a. Debris definition: Elements including, but not limited to, concrete, concrete masonry, wood, excavated rock and rock fragments, rubble, overburden soils, abandoned utility
structures, trash, refuse and litter.

3. Confirm that no adverse drainage conditions are present.
4. Confirm that no conditions are present which are detrimental to plant growth.

B. If unsatisfactory conditions are encountered, notify the Landscape Architect immediately to determine corrective action before proceeding.

3.2 SOIL INSTALLATION

A. All equipment utilized to install or grade Soils shall be wide track or balloon tire machines rated with a ground pressure of 4 psi or less. All grading and soil delivery equipment shall have buckets equipped with 6 inch long teeth to scarify any soil that becomes compacted.

B. In areas of soil installation above existing subsoil, scarify the subgrade material prior to installing Soil.
   1. Scarify the subsoil of the subgrade to a depth of 3 – 6 inches with the teeth of the backhoe or loader bucket, tiller or other suitable device.
   2. Immediately install the Planting Soil. Protect the loosened area from traffic. DO NOT allow the loosened subgrade to become compacted.
   3. In the event that the loosened area becomes overly compacted, loosen the area again prior to installing the Planting Soil.

C. Install the Planting Soil in 1 1/2 - 18 inch lifts to the required depths. Apply compacting forces to each lift as required to attain the required compaction. Scarify the top of each lift prior to adding more Planting Soil by dragging the teeth of a loader bucket or backhoe across the soil surface to roughen the surface.
   1. Approved compaction equipment includes a smooth drum roller or plate compactor. Typically one to three passes per lift will achieve the desired compaction. Contractor to test desired compaction methodology with actual soil to be installed to confirm installation method and material properties are compatible and will achieve the specified compaction rates.
   2. Provide adequate equipment to achieve consistent and uniform compaction of the Soils. Use the smallest equipment that can reasonably perform the task of spreading and compaction. Use the same equipment and methods of compaction for the entire project area once soil, installation methodology, and compaction criteria have been coordinated and confirmed.

D. Do not pass motorized equipment over previously installed and compacted soil except as authorized below.
   1. Light weight equipment such as trenching machines or motorized wheel barrows is permitted to pass over finished soil work.
   2. If work after the installation and compaction of soil compacts the soil to levels greater than the above requirements, follow the requirements of Over Compaction Reduction herein.

E. Phase work such that equipment to deliver or grade soil does not have to operate over previously installed Planting Soil. Work in rows of lifts the width of the extension of the bucket on the loader. Install all lifts in one row before proceeding to the next. Work out from the furthest part of each bed from the soil delivery point to the edge of each bed area.
F. Where travel over installed soil is unavoidable, limit paths of traffic to reduce the impact of compaction in Planting Soil. Each time equipment passes over the installed soil it shall reverse out of the area along the same path with the teeth of the bucket dropped to scarify the soil. Comply with Over Compaction Reduction herein in the event that soil becomes over compacted. Access over finished grade soils shall be restricted. If access is required across placed soils, Contractor shall be required to rework compacted soil areas prior to fine grading to the full depth of the placed soils.

G. The depths and grades shown on the Drawings are the final grades after settlement and shrinkage of the compost material. The Contractor shall install the Planting Soil at a higher level to anticipate this reduction of Soil volume. A minimum settlement of approximately 10 - 15% of the soil depth is expected. All grade increases are assumed to be as measured prior to addition of surface Compost till layer, mulch, or sod.

H. Maintain moisture conditions within the Soil during installation or modification to allow for satisfactory compaction.

1. Volumetric soil moisture level during installation shall be above permanent wilt point and below field capacity for each type of soil texture within the following ranges.

<table>
<thead>
<tr>
<th>Soil texture</th>
<th>Permanent wilting point</th>
<th>Field capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand, Loamy sand, Sandy loam</td>
<td>5-8%</td>
<td>12-18%</td>
</tr>
<tr>
<td>Loam, Sandy clay, Sandy clay loam</td>
<td>14-25%</td>
<td>27-36%</td>
</tr>
<tr>
<td>Clay loam, Silt loam</td>
<td>11-22%</td>
<td>31-36%</td>
</tr>
<tr>
<td>Silty clay, Silty clay loam</td>
<td>22-27%</td>
<td>38-41%</td>
</tr>
</tbody>
</table>

2. The Contractor shall confirm the soil moisture levels with a moisture meter (Digital Soil Moisture Meter, DSMM500 by General Specialty Tools and Instruments, or approved equivalent). Suspend operations if the Soil becomes wet. Apply water if the soil is overly dry.

I. Installing Planting Soil with soil or mulch blowers or soil slingers is not permitted.

3.3 SOIL COMPACCTION REQUIREMENTS

A. The following are threshold levels of compaction as determined by each method for the subsoil surface and full profile of Planting Soil, testing each lift of Soil with a penetrometer. The same penetrometer and moisture meter shall be used to test installed soil throughout the work.

1. Acceptable Compaction
   a. Standard Proctor Method – 75-85%.
   b. Penetration Resistance Method – about 75-250 psi.
   c. Soil below 75 psi soil becomes increasingly unstable and will settle excessively.

2. Unacceptable Compaction
   a. Standard Proctor Method – Above 85%.
   b. Penetration Resistance Method – Approximately above 300 psi

3. Prior to testing the soil with the penetrometer check the soil moisture. Penetrometer readings are impacted by soil moisture and excessively wet or dry soils will read significantly lower or higher than soils at optimum moisture.

4. The penetrometer readings shall be within 20% plus or minus of the specified levels.
5. Where the Standard Proctor Method is utilized, the following Bulk Density levels based on 75% minimum and 85% maximum standard Proctor indicate acceptable compaction.

<table>
<thead>
<tr>
<th>Soil Texture</th>
<th>Bulk Density (g/cm³)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Max.</td>
</tr>
<tr>
<td>Loamy Sand</td>
<td>1.80</td>
</tr>
<tr>
<td>Sandy Loam</td>
<td>1.65</td>
</tr>
<tr>
<td>Sandy clay loam</td>
<td>1.55</td>
</tr>
<tr>
<td>Loam</td>
<td>1.50</td>
</tr>
<tr>
<td>Silt Loam</td>
<td>1.45</td>
</tr>
</tbody>
</table>

3.4 OVER COMPACTION REDUCTION

A. Compacted soil: soil where the density of the soil, at each lift for the full profile, is greater than the threshold for root limiting, and further defined in this specification.

B. Any soil that becomes compacted to a density greater than the specified density shall be dug up and reinstalled. This requirement includes compaction caused by other sub-contractors after the Planting Soil is installed and approved.

C. Surface roto tilling shall not be considered adequate to reduce over compaction at levels 6 inches or greater below finished grade.

3.5 INSTALLATION OF CHEMICAL ADDITIVES

A. Following the installation of each soil and prior to fine grading and installation of the Compost till layer, apply chemical additives as recommended by the soil test, and appropriate to the soil and specific plants to be installed.

3.6 FINE GRADING

A. Fine grading: The final grading of the soil to achieve exact contours and positive drainage, often accomplished by hand rakes or drag rakes other suitable devices, and further defined in this specification, and further defined in this specification.

B. The Landscape Architect shall approve all rough grading prior to the installation of Compost, fine grading.

C. Grade the finish surface of all planted areas to meet the grades shown on the Drawings, allowing the finished grades to remain higher than the grades on the grading plan, as defined in paragraph Soil Installation, to anticipate settlement over the first year.

D. Utilize hand equipment, small garden tractors with rakes, or small garden tractors with buckets with teeth for fine grading to keep surface rough without further compaction. Do not use the flat bottom of a loader bucket to fine grade, as it will cause the finished grade to become overly smooth and or slightly compressed.

E. Provide for positive drainage from all areas toward the existing inlets, drainage structures and or the edges of planting beds. Adjust grades as directed to reflect actual constructed field conditions of paving, wall and inlet elevations. Notify the Landscape Architect in the event that conditions make it impossible to achieve positive drainage.
F. Provide smooth, rounded transitions between slopes of different gradients and direction. Modify the grade so that the finish grade before adding mulch and after settlement is one or two inches below all paving surfaces or as directed by the Drawings.

3.7 INSTALLATION OF IN-SITU COMPOST AMENDMENT

A. After Planting Soil are installed in planting bed areas, spread 2 – 3 inches of Compost over the beds and roto till into the top 4 - 6 inches of the Planting Soil. This step will raise grades slightly above the grades required in Fine Grading herein. This specification anticipates that the raise in grade due to this tilling will settle within a few months after installation as Compost breaks down. Additional settlement as defined in paragraph “Soil Installation” must still be accounted for in the setting of final grades.

B. Soil Tilling: Loosening the surface of the soil to the depths specified with a rotary tine tilling machine, roto tiller, (or spade tiller), and further defined in this specification.

3.8 PROTECTION

A. Protection Zone: Identify protection zones according to Section "Construction Tree Protection."

B. Protect areas of in-place soil from additional compaction, disturbance, and contamination. Prohibit the following practices within these areas except as required to perform planting operations:
   1. Storage of construction materials, debris, or excavated material.
   2. Parking vehicles or equipment.
   3. Vehicle traffic.
   4. Foot traffic.
   5. Erection of sheds or structures.
   6. Impoundment of water.
   7. Excavation or other digging unless otherwise indicated.

C. If planting soil or subgrade is overcompacted, disturbed, or contaminated by foreign or deleterious materials or liquids, remove the planting soil and contamination; restore the subgrade and replace contaminated planting soil with new planting soil.

3.9 CLEANING

A. Protect areas adjacent to planting-soil preparation and placement areas from contamination. Keep adjacent paving and construction clean and work area in an orderly condition.

B. Remove surplus soil and waste material including excess subsoil, unsuitable materials, trash, and debris and legally dispose of them off Owner's property unless otherwise indicated.

END OF SECTION
SECTION 329300 PLANTING – ADD ALTERNATE 1

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including General Conditions and other Division 01 Specification Sections, apply to work of this Section.

1.2 SECTION INCLUDES

A. Extent of work is shown on Drawings and includes but is not limited to:
   1. Furnish and install trees, shrubs, perennials, grasses and groundcover.
   2. Nursery visits and plant selection.
   3. Tree stabilization.
   4. Clean up.

1.3 RELATED SECTIONS

A. Section 329100 – Soil Preparation

1.4 REFERENCES

A. The following apply to work in this Section:

1.5 SUBMITTALS

A. Submit name, address, and phone number of proposed Agricultural Chemist.

B. Certifications: Submit certificate with names of materials and manufacturer.
   1. Plants: Furnish certificates of inspection as may be required by Federal, State or other authorities that plants are free of disease or hazardous insects.
   2. Commercial fertilizers: Include guaranteed analysis.

C. Instructions: Submit planting and maintenance schedule.
   1. Submit in writing the proposed planting schedule indicating dates for tagging and installation for trees, shrubs, herbaceous plants, ornamental grasses, and groundcovers.

D. Product data: Submit product literature or tear sheets with name of product, and manufacturer.
1. Organic soil amendment.
2. Mulch.

E. Samples: Submit loose materials in sealed bags labeled with name of material and manufacturer.
   1. Mulch, 1-gallon re-sealable plastic bag.

F. Source of supply: Submit in writing all proposed sources.
   1. Locate trees and make all pre-selection arrangements at the source of supply required to ensure an efficient selection procedure. Landscape Architect, with Contractor present, will select plants at nursery on the basis of their compliance with the Drawings. Contractor shall inspect the selected plants on the basis that the plants are free of disease and otherwise conform to the requirements of the Contract Documents. The accuracy of the varieties of species specified for plant material shall be the Contractor's responsibility. Request visit at least 14 days in advance of desired inspection date.
      a. Trees will be inspected and reviewed by Landscape Architect at the nursery for conformity to Specification requirements. Such review shall not affect the right of inspection and rejection during delivery and installation.
      b. All trees specified as B&B must be in the ground at the growing source (nursery) at the time of inspection. Pre-dug trees shall not be acceptable.
      c. Photographs shall be provided to the Landscape Architect prior to scheduling any nursery visits. Include color photographs in digital format (sent via email) at least 4 by 6-inch of each required species and size of plant material as it will be furnished to the Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. For species where more than 20 plants are required, include a minimum of three photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.

G. Warranty: Sample of special warranty.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful establishment of plants.
   1. Experience: Five years' experience in landscape installation in addition to requirements in Section 014000 "Quality Requirements."
   2. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.

B. Plants: Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.
   1. Plant List: Investigate sources of supply prior to submitting bid. Confirm that size, variety and quantity of plants specified on Plant List can be supplied. Failure to take this
precaution shall not relieve the successful bidder from responsibility for furnishing and installing all plants in strict accordance with Contract requirements.

a. Substitutions shall not be permitted unless substantiated written proof is supplied that a specified plant is not available. Proposals to use the nearest equivalent size or variety will only be considered with such substantiated written proof.

b. Plant substitutions will be permitted only upon approval by the Landscape Architect.

c. All plants shall be grown on their own roots. No grafted species shall be acceptable.

2. Selection of plants purchased under allowances will be made by Architect, who will tag plants at their place of growth before they are prepared for transplanting.

C. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.

1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container-grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches above the root flare for trees up to 4-inch caliper size, and 12 inches above the root flare for larger sizes.

2. Other Plants: Measure with stems, petioles, and foliage in their normal position.

1.7 DELIVERY STORAGE AND HANDLING

A. Packaged materials: Deliver packaged materials in clearly marked containers showing net weight, guaranteed analysis and name of manufacturer. Specified requirements for packaged materials apply to bulk shipments. Protect materials from deterioration during delivery and during storage.

1. Deliver fertilizer in waterproof bags.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.

2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.

3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.

C. Plants: Notify Owner seven (7) days in advance of any delivery of plants to site.

1. Dig and handle trees with care to prevent injury to trunks, branches and roots. Do not prune prior to delivery. Do not bend or bind-tie trees in such manner as to damage bark, break branches or destroy natural shape. Pack and ship to ensure arrival at site in good condition. Provide protective covering during delivery. Plants with cracked or broken root balls shall not be accepted.

2. Deliver plants after preparation of planting areas has been completed and approved, install plants immediately.
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PLANTING

a. If planting is delayed more than eight (8) hours after delivery, set balled and burlapped (B&B) plants on the ground well protected with soil, wet mulch or other acceptable material. Protect balls and roots, and container grown material from freezing, sun, drying winds and/or mechanical damage. Water as necessary until planted.

b. Do not heel in plants for more than two (2) weeks without prior approval from Construction Manager.

3. Immediately remove rejected plants from site.

D. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.

E. Handle planting stock by root ball.

F. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

1. Set balled stock on ground and cover ball with soil, mulch, or other acceptable material.

2. Do not remove container-grown stock from containers before time of planting.

3. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly-wet condition.

1.8 PROJECT CONDITIONS

A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.

B. Environmental requirements:

1. Plant only within the following dates, weather permitting. Do not plant when ground is frozen or when the soil is excessively wet, or in otherwise unsatisfactory condition.

   a. Plant B&B deciduous trees, shrubs and groundcover between April 1 and June 15, and September 15 and November 15. If plants must be planted during alternate dates, review proposed planting date with Landscape Architect.

2. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

C. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.

1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.
1.9 SEQUENCING AND SCHEDULING

A. Coordinate work of this Section with work of all other Sections of Specification.

1.10 GUARANTEE PERIOD FOR PLANTS

A. Guarantees shall be in addition to, and not in lieu of, all other liabilities which manufacturers and Contractor may have by law or by other provisions of the Contract Documents.

B. Contractor shall not be held responsible for acts of vandalism occurring after the beginning of Guarantee Period, nor shall Contractor be held responsible for deleterious effects caused by maintenance procedures performed by Owner without concurrence of Contractor.

C. Replace at no additional cost for a period of one growing seasons after the beginning date of Guarantee Period, any trees that have died or that are, in the opinion of Owner, in unhealthy or unsightly condition, or that have lost their natural shape due to dead branches, excessive pruning, excessive defoliation.

1. A growing season is defined as the period during which plant growth takes place from last killing frost of Spring to the first killing frost of Autumn.

2. Replace unacceptable plants no later than the next succeeding planting season. All replacements shall have a guarantee of one planting season from date of replacement.
   a. Replace unacceptable plants in accordance with original Specification. Cost is considered to be included in the Bid and Contract Price.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL, GENERAL

A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant Schedule or Plant Legend shown on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

B. If formal arrangements or consecutive order of plants is shown on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

C. Labeling: Label at least one plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant as shown on Drawings.

D. All vegetation is to be drought tolerant, native, and/or locally adapted.

2.2 TREES

A. Provide freshly dug trees nursery grown in accordance with good horticultural practice.
1. Sound, healthy and vigorous, well-branched and fully foliated when in leaf. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4 inch in diameter; or with stem girdling roots will be rejected.
2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.
3. Nomenclature: Agree with SPN or as accepted in the nursery trade for varieties not listed therein.

B. Conform to measurements specified on Plant List. Dimension plants in their natural position. Measure height or spread and quality in accordance with standards specified in ASNS.

C. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Landscape Architect, with a proportionate increase in size of roots or balls.

D. Provide B&B stock with a compact natural ball of earth, firmly wrapped and tied in burlap so that upon delivery the soil in the ball is still firm and compact about the small feeding roots. Root ball sizes shall be in accordance with standards specified in ASNS.

E. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

F. Plants shall be measured before pruning, with branches in normal position. Any necessary pruning shall be done at time of planting. Requirements for the measurement, branching, grading, quality, balling, and burlapping of plants shall be in accordance with standards specified in ASNS.

2.3 GROUNDCOVER

A. Furnish in sizes indicated on plant list and conform to ASNS standards for species and sizes.

B. All container grown plants shall be healthy, vigorous, well rooted and established in the container in which they are sold. Plant development shall be sufficient so that the root mass will hold together when removed from the container.

2.4 MULCH

A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and groundcovers, consisting of one of the following:
   1. Type: Double shredded hardwood bark.
   2. Size Range: 3 inches maximum, 1/2 inch minimum.

2.5 WATER

A. Potable, clean fresh and free from harmful materials.

B. No permanently installed irrigation for exterior landscape should be installed.
2.6 TREE STABILIZATION MATERIALS

A. Stakes and Guys (Contractor to determined if these are required based on site conditions):

1. Upright and Guy Stakes: Rough-sawn, sound, new hardwood, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal by length indicated, pointed at one end.
2. Flexible Ties: Wide rubber or elastic bands or straps of length required to reach stakes or compression springs.
4. Tree-Tie Webbing: UV-resistant polypropylene or nylon webbing with brass grommets.
5. Flags: Standard surveyor's plastic flagging tape, white, 6 inches long.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive plants for compliance with requirements and conditions affecting installation and performance.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.

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

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

D. Verify that excavation, grading and paving is complete.

E. Do not begin planting until all other work, except lawn work, is complete.

F. Beginning installation means acceptance of existing conditions.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.

Lay out individual tree and shrub locations and outline areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Landscape Architect's acceptance of layout before excavating or planting. Make minor adjustments as required.
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B. Verify by testing that planting areas are free draining. If planting areas are not free draining notify Landscape Architect and submit recommendation to restore drainage for approval.

C. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.

3.3 INSTALLATION

A. Planting Pits and Trenches for Trees and Shrubs: Excavate circular planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are not acceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.

1. Do not plant until layout has been approved by Landscape Architect.
2. Excavate approximately three times as wide as ball diameter for balled and burlapped or container-grown stock.
3. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk.
4. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
5. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
6. Maintain required angles of repose of adjacent materials as shown on the Drawings. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
7. Maintain supervision of excavations during working hours.
8. Keep excavations covered or otherwise protected when unattended by Installer's personnel.
9. Plant to such depth that the finished grade level of the tree or shrub, after settlement, will be the same as that at which the plant was grown.
10. Plant upright and plumb and faced to give the best appearance or relationship to adjacent plants and structures.
11. Do not pull burlap out from under balls. Remove platforms, wire and surplus binding from the top and sides of ball. Cut and remove the top 1/3 of burlap from planting pit. Cleanly cut off all broken or frayed roots.
12. Remove all non-biodegradable materials from the planting area.
13. Do not use planting stock if root ball is cracked or broken before or during planting operation.
14. Backfill shall be comprised of excavated soil mixed with Compost. Mix ratio 4 parts soil to 1 part Compost. Turn Compost into soil with hand shovel.
15. Backfill around root ball in 6-inch deep layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
16. Apply water slowly to ensure penetration into the entire root system.
17. When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.
18. Mulch within two (2) days of planting. Install 2-inch depth within mulch ring at trees in lawn.
19. Neatly prune trees and shrubs to remove broken or badly bruised branches with a clean cut in accordance with NAA standards, and at the time designated by, and to the satisfaction of Owner.
   a. Preserve the plant's natural character,
   b. Perform pruning with clean, sharp tools.
   c. Do not apply pruning paint to wounds.

B. Planting herbaceous plants, ornamental grasses, and groundcovers:
1. Add planting soil to depths and limits indicated on Drawings. Grade smooth immediately before planting.
2. Plant ground cover, perennials or grasses in neat staggered rows or as shown on Drawings to insure adequate coverage.
3. Remove plastic containers before planting.
4. Dig holes large enough to allow spreading of roots.
5. Work soil around roots to eliminate air pockets.
6. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.
7. Mulch within two (2) days of planting. Install two (2) inches of mulch continuously over entire planting beds. Keep mulch at least 2 inches away from base of plant.

3.4 TREE STABILIZATION

A. Drawings do not indicate tree stabilization. If contractor is unable to provide the required guarantee for trees without guying, this work shall be included at no additional cost to the Owner. Guying, if provided, shall conform to recognized and accepted horticultural standards.

B. If conditions dictate stabilization, install trunk stabilization as follows unless otherwise indicated:
1. Upright Staking and Tying: Stake trees of 2- through 5-inch caliper. Stake trees of less than 2-inch caliper only as required to prevent wind tip out. Use a minimum of two stakes of length required to penetrate at least 18 inches below bottom of backfilled excavation and to extend at least 60 inches above grade. Set vertical stakes and space to avoid penetrating root balls or root masses.
2. Use two stakes for trees up to 12 feet high and 2-1/2 inches or less in caliper; three stakes for trees less than 14 feet high and up to 4 inches in caliper. Space stakes equally around trees.
3. Support trees with two strands of tie wire, connected to the brass grommets of tree-tie webbing at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.

3.5 EDGING INSTALLATION

A. Shovel-Cut Edging: Separate mulched areas from turf areas with a 45-degree, 4- to 6-inch deep, shovel-cut edge.

3.6 PLANT MAINTENANCE PRIOR TO SUBSTANTIAL COMPLETION

A. Begin maintenance immediately after each planting area is installed.
B. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease.

C. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.

D. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated past management practices whenever possible to minimize the use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

E. Prior to inspection for Substantial Completion remove all excess soil and debris from site and repair damage resulting from planting operations.

3.7 PLANT MAINTENANCE DURING GUARANTEE PERIOD

A. General: Perform procedures set forth in the submitted and approved maintenance program for the duration of Guarantee Period.

B. Inspect all trees at least once a month to locate any disease or pest infestations. If infestation is present, submit a proposed method of control to Owner for approval prior to application of control measures.

C. Remove dead trees within ten (10) days of notification by Owner.

   1. Replacement trees may be installed during the next appropriate planting season.
   2. Replacement trees shall be of the same species and size as specified in the Plant List.

3.8 CLEAN UP AND PROTECTION

A. Maintain the site in an orderly condition during the progress of work. Promptly remove debris and trash. Leave the site in a neat, orderly condition, broom clean.

B. During planting, keep adjacent paving and construction clean and work area in an orderly condition.

C. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

D. After installation and before Substantial Completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

3.9 FINAL ACCEPTANCE

A. At end of Guarantee Period, submit a written request for Inspection for Final Acceptance at least two (2) weeks prior to the day on which inspection is requested.
B. At the end of the Guarantee Period, Owner, Landscape Architect and Contractor shall make an inspection to determine that all plants are living and healthy. Any tree that is dead or not in satisfactory condition, as determined by the Owner, shall be removed from the site and replaced in accordance with the specifications. New trees installed, as part of the original one-year guarantee shall also carry a new one-year guarantee period, which begins at the time of acceptance of the replacements plant(s). Any replacement and repair work that is required shall be re-inspected by the Owner.

END OF SECTION
ASBESTOS ABATEMENT WORKPLAN
WESTBY HALL
ROWAN UNIVERSITY
GLASSBORO, NEW JERSEY 08028

PREPARED FOR:
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PARS Project No.: 1200-03

April 2018
Reviewed/Approved by:

Julian Fernandez-Obregon  
Project Manager  
Date: 4/16/18

Prepared by:

Rafael L. Torres, III  
USEPA AHERA Project Designer  
Date: 4/16/18
Revisions

Revision 1. Date: ___________ Amended By: _______________________

Revision 2. Date: ___________ Amended By: _______________________

Revision 3. Date: ___________ Amended By: _______________________
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**Figure 1:** ACM Location Maps

**Appendix A:** Photo Log
1.0 INTRODUCTION

PARS Environmental, Inc. (PARS), on behalf of Rowan University (Rowan) prepared this Asbestos Abatement Work Plan to address the removal of asbestos-containing materials (ACM) at Westby Hall (Site) located on the campus of Rowan University in Glassboro, New Jersey. This Asbestos Abatement Work Plan details the planning, administration, execution, and cleaning necessary to safely remove ACM and contaminated materials from the building prior to renovation activities. All asbestos abatement activities will comply with all local, State, and Federal codes, laws, and regulations governing asbestos removal.

Based on visual inspections and laboratory analytical results, approximately 2,000 linear feet of asbestos-containing caulk and glazing were identified in the proposed renovation area of Westby Hall. These materials shall be removed by a New Jersey licensed asbestos abatement contractor prior to renovation activities. An ACM location map is included as Figure 1. A photo log of the Site and windows to be removed is included as Attachment A.
2.0 BACKGROUND AND DEFINITIONS

2.1 Description of the Abatement Work
2.1.1 The asbestos abatement shall also include, but not be limited to the following:
   (a) Notification to regulatory agencies
   (b) Regulatory permits, licenses and approvals
   (c) Worker health and safety program
   (d) Air monitoring
   (e) Construction of containment barrier/decontamination enclosures
   (f) Preparation for abatement operations
   (g) Removal of existing ACM
   (h) Transport and disposal of ACM
   (i) Decontamination and cleaning
   (j) Application of lockdown encapsulants
   (k) Removal of temporary containment barrier/decontamination enclosures
   (l) Final job close-out

2.1.2 Other Work Not Included: PARS reserves the right to collect and analyze samples or retain an independent testing laboratory to provide supplemental sampling services. These services will in no way relieve the Contactor from compliance liability or from providing the testing required by these specifications or any other requirements of other agencies with jurisdiction authority.

2.2 Definitions

2.2.1 Abatement: Procedures to control or eliminate fiber release from asbestos-containing building materials, to include encapsulation, enclosure and removal.

2.2.2 Abatement Work Area (regulated area): An area established by the employer to demarcate areas where Class I, II, III and IV asbestos work is conducted, and any adjoining area where debris and waste from such asbestos work accumulate; and a work area within which airborne concentrations of asbestos, exceed or there is a reasonable possibility they may exceed the permissible exposure limit.

2.2.3 Airlock: A system of enclosures within the containment area consisting of two (2) doorways, curtained with polyethylene sheeting, at least 1 meter apart.

2.2.4 Air Filtration Units: A local exhaust unit, utilizing high-efficiency particulate air (HEPA) filtration and capable of maintaining a minimum negative pressure differential of 0.05 mm of water within the containment barrier with respect to that of the environment surrounding the containment barrier. The unit also cleans recirculated air or generates a constant air flow from adjacent areas into the abatement work area through the decontamination enclosure.

2.2.5 Air Monitoring: The process of measuring the fiber content of a specific volume of air during a stated period of time.
2.2.6 Air Pressure Monitoring: The process of measuring the air pressure differential between the containment barrier and the surrounding area using a micromanometer unit.

2.2.7 Amended Water: Water to which a surfactant (wetting agent) has been added to increase the ability of the liquid to penetrate asbestos containing materials (ACM).

2.2.8 ANSI: American National Standards Institute.

2.2.9 ASTM: American Society for Testing and Materials.

2.2.10 Asbestos: Asbestiform varieties of chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite.

2.2.11 Asbestos-Containing Material (ACM): Any material containing more than 1% asbestos by volume of any type or mixture of types.

2.2.12 Authorized Person: Any person authorized by the SI and required by work duties to be present in a regulated area.

2.2.13 Caulking: High-grade rubber base caulk for masonry and/or for other materials to be used or existing, as appropriate.

2.2.14 Class I Asbestos Work: Activities involving the removal of thermal systems insulation (TSI) and surfacing ACM and presumed asbestos containing materials (PACM).

2.2.15 Class II Asbestos Work: Activities involving the removal of ACM which is not TSI or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastics.

2.2.16 Class III Asbestos Work: Repair and maintenance operations, where ACM, including TSI and surfacing ACM and PACM, is likely to be disturbed.

2.2.17 Class IV Asbestos Work: Maintenance and custodial activities during which employees contact but do not disturb ACM or PACM and activities to clean up dust, waste and debris resulting from Class I, II and III activities.

2.2.18 Clean Room: An uncontaminated area or room which is part of the abatement worker/equipment decontamination enclosure, with provisions for storage of workers' or visitors' street clothing, protective equipment and uncontaminated materials and equipment. It may be used for changing clothes.

2.2.19 Competent Person: In addition to the definition in 29 CFR 1926.32 (f), one who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, who has the authority to take prompt
corrective measures to eliminate them, as specified in 29 CFR 1926.32 (f). In addition, the competent person shall have successfully completed training for Class I, Class II, Class III, and Class IV projects meeting the criteria set forth in the EPA Model Accreditation Plan (40 CFR 763) for project designer or supervisor, and operations and maintenance training.

2.2.20 Containment Barrier: A temporary enclosure constructed with fire-retardant plastic sheeting, suitable framing, tape (as defined in 1.3.52) and other adhesives within the abatement work area. This barrier serves to confine the asbestos abatement and decontamination work, and to contain the release of asbestos containing dust and debris through the action of pressure differential ventilation and air filtration systems. The only entrance is via the abatement worker/equipment decontamination enclosure.

2.2.21 Critical Barrier: Those portions of the containment barrier which represent the minimum structural components necessary to maintain the asbestos removal area in airtight isolation from the surrounding areas. Critical barriers shall be placed at floors, windows, ventilation louvers and other openings as necessary to achieve abatement work area isolation before putting up the double-layer plastic sheeting containment enclosure within which abatement work is performed. If a temporary plastic sheeting/stud wall must be erected, it shall be treated as a critical barrier. The double-layer plastic sheeting containment enclosure shall then be erected on that wall. Wrappings on lights, control boxes, etc., do not constitute part of the critical barrier.

2.2.22 Curtained Doorway: A minimum 2-flap passageway to allow access or egress from one room to another while permitting minimal air movement between the rooms of the decontamination enclosure system. It is constructed by placing 2-3 overlapping sheets of plastic sheeting at least three feet wide over an existing or temporarily framed doorway. The sheets shall be weighted at the bottom so that they close quickly after being released.

2.2.23 Decontamination Enclosure: A series of connected rooms with curtained doorways between each room, for the decontamination of the abatement workers and equipment/materials. A decontamination enclosure contains a minimum of three (3) separate rooms (typically with airlocks located between the rooms) consisting of an equipment room, shower room, and clean room. The system is constructed of an airtight, impermeable, temporary barrier. Framing for enclosure shall be metal or fire retardant pressure impregnated wood.

2.2.24 Disposal Bag: A properly labeled minimum 0.15 mm (6 mil) thick, leak-tight plastic bag used for transporting asbestos waste from the abatement work area to an EPA-approved disposal site for ACM waste.

2.2.25 Disturbance: Contact which releases fibers from ACM or presumed asbestos-containing material (PACM) or debris containing ACM or PACM. This term includes activities that disrupt the matrix of ACM or PACM, render ACM or PACM friable, or generate visible debris. Disturbance includes cutting away small amounts of ACM and
PACM, no greater than the amount which can be contained in one standard sized glove bag (as defined in 2.2.33) or waste bag in order to access a building component. In no event shall the amount of ACM or PACM so disturbed exceed that which can be contained in one glove bag or waste bag which shall not exceed 1.52 m in length and width.

2.2.26 **Encapsulant**: A material applied after the removal of ACM or to the ACM-edges of partially abated substrates which surrounds or embeds residual asbestos fibers in an adhesive matrix to prevent their release into the atmosphere. Encapsulation for purpose of final lockdown is not to be accomplished until after the project has passed final air clearance tests.

2.2.27 **Enclosure**: Procedures necessary to completely enclose material containing asbestos behind airtight, impermeable, permanent barriers.

2.2.28 **Equipment Room**: A contaminated area or room which is part of the decontamination enclosure, with provisions for storage of contaminated clothing and equipment and cleaning supplies for decontamination of equipment. Airlocks are required at all entrances to the equipment room.

2.2.29 **EPA**: United States Environmental Protection Agency.

2.2.30 **Excursion Limit**: Airborne concentration of asbestos in excess of 1.0 fiber per cubic centimeter of air (1 f/cc), as averaged over a sampling period of thirty minutes.

2.2.31 **Fiber**: A particulate form of asbestos, 5 micrometers or longer, with a length-to-width ratio of at least 3 to 1.

2.2.32 **Fixed Object**: A unit of equipment or furniture in the abatement work area which cannot be removed from the abatement work area.

2.2.33 **Glove Bag**: A pouch, typically constructed of a minimum 0.15 mm (6 mil) thick, 1.5 m x 1.5 m (maximum), transparent polyethylene or polyvinylchloride plastic, with inward projecting sleeve gloves to abate ACM in a sealed micro-environment with designated inlets for amended water and sealant application, and a HEPA filtered vacuum unit attachment. The pouch has capacity for tool storage and to hold removed ACM.

2.2.34 **GFCI (Ground Fault Circuit Interrupter)**: A type of ground fault protection in areas where personnel are at high risk of receiving electrical shocks (for example, in damp locations); makes use of a device designed to trip at a ground current in the milliampere range, i.e., very much below currents that are normally harmful.

2.2.35 **HEPA Filter**: A High Efficiency Particulate Air (HEPA) filter capable of trapping and retaining 99.97% of all mono-dispersed particles 0.3 micrometer in diameter or larger.
2.2.36 **HEPA-Filtered Vacuum Cleaner:** HEPA-filtered vacuuming equipment with a filter system capable of collecting and retaining asbestos fibers.

2.2.37 **Holding Area:** A chamber between the washroom and uncontaminated area in the equipment decontamination enclosure system.

2.2.38 **Impermeable Waste-Disposal Containers:** Suitable to receive and retain any asbestos-containing or contaminated material until disposal at an approved site. The containers shall be labeled in accordance with OSHA Regulation 29 CFR 1910.1001 and 29 CFR 1926.1101. Containers must be both water-tight and air-tight.

2.2.39 **Lockdown:** The process of applying encapsulant as a finishing coat to abated surfaces after project has successfully passed final air clearance tests.

2.2.40 **Movable Object:** A unit of equipment or furniture in the abatement work area which can be removed from the abatement work area.

2.2.41 **MSHA:** Mine Safety and Health Administration:

2.2.42 **Negative Exposure Assessment (NEA):** A demonstration by the Contractor, which complies with the criteria in OSHA 29 CFR 1926.1101(f)(2)(iii), that employee exposures during an operation are expected to be consistently below the permissible exposure limits (PELs). Such assessment is to be used to justify level of respiratory protection to be used on the job.

2.2.43 **NESHAPS:** National Emissions Standard for Hazardous Air Pollutants.

2.2.44 **N.E.C.:** National Electrical Code.

2.2.45 **NIOSH:** National Institute for Occupational Safety and Health.

2.2.46 **OSHA:** Occupational Safety and Health Administration.

2.2.47 **PACM:** Presumed Asbestos-Containing Material, meaning thermal system insulation and surfacing material found in buildings constructed no later than 1980.

2.2.48 **PEL:** Permissible Exposure Limit. An occupational limit of exposure to a chemical substance or physical agent.

2.2.49 **Personal Monitoring:** Sampling of asbestos fiber concentrations within the breathing zone of an employee. Breathing zone is defined as a radius of 150 mm to 250 mm around the employee's head.

2.2.50 **Personal Protective Equipment:** Equipment which may consist of coveralls, shoes, gloves, helmet, goggles, and respirator used for protection against asbestos exposure.
2.2.51 **Plastic Sheeting:** Fire retardant Polyethylene sheet material of specified thickness used for protection of walls, floors, etc., and critical barriers in the abatement work area.

2.2.52 **Protection Factor:** The ratio of the ambient concentration of an airborne substance to the concentration of the substance inside the respirator at the breathing zone of the wearer. The protection factor is a measure of the degree of protection provided by a respirator to the wearer.

2.2.53 **Respirator:** A device designed to protect the wearer from the inhalation of harmful atmospheres and approved by NIOSH or MSHA for a specific category of use.

2.2.54 **Surfactant:** A chemical wetting agent added to water to decrease surface tension and improve material penetration.

2.2.55 **Tape:** Glass fiber or other tape capable of sealing joints of adjacent sheets of plastic (0.15 mm [6 mil] polyethylene) and for attachment of plastic sheets to finished or unfinished surfaces of dissimilar materials under both dry and wet conditions, including use of amended water. Minimum tape width shall be 51 mm.

2.2.56 **Warning Labels and Signs:** As required by OSHA regulations 29 CFR 1910.1001 and 1926.58.

2.2.57 **Waste Water Filters:** Discharged liquids shall pass through a primary filter and the output shall be particles 20 microns or smaller. The secondary filter shall have output particles 5 microns or smaller.

2.2.58 **Wet Cleaning:** The process of eliminating asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning tools which have been dampened with amended water.
3.0 REGULATIONS AND SUBMITTALS

3.1 Regulations
The Contractor shall comply with the most current edition of all local, State, and Federal codes and ordinances as they apply to the location(s) in which the work is performed. Make available for review at the site one copy of all applicable local, State, and Federal regulations governing the abatement work, including but not limited to:

3.1.1 Occupational Safety and Health Administration (OSHA), U.S. Dept. of Labor
   (a) 29 CFR 1910 (General Industry) and 29 CFR 1926 (Construction) Occupational Safety and Health Standards
   (b) 29 CFR 1910.1001 and 29 CFR 1926.1101 Asbestos
   (c) 29 CFR 1910.134 Respiratory Protection
   (d) 29 CFR 1910.1200 Hazard Communication

3.1.2 U. S. Department of Transportation (DOT)
   (a) 49 CFR 171 Subchapter C, Hazardous Materials Regulations
   (b) 49 CFR 172 Subchapter C, Shipping Container Specifications

3.1.3 U.S. Environmental Protection Agency (EPA)
   (a) 40 CFR 763, Toxic Substances Control Act; particularly Subpart E, Asbestos Containing Materials in Schools
   (b) 40 CFR 61, Sub-parts A and M, National Emission Standard for Hazardous Air Pollutants (NESHAPS)

3.1.4 New Jersey Department of Community Affairs (DCA)
   (a) N.J.A.C. 5:23-8, Asbestos Hazard Abatement Subcode

3.1.5 New Jersey Department of Environmental Protection (DEP)
   (a) N.J.A.C. 7:26, Division of Solid and Hazardous Waste Rules

3.1.6 New Jersey Department of Labor and Workforce Development (DOL)
   (a) N.J.S.A. 34:5A-32, Asbestos Control Licensing Act
3.1.7 American National Standards Institute (ANSI), 1430 Broadway, New York, New York 10018. Telephone (212)354-3300

(a) ANSI Publication Z88.2 Practices for Respiratory Protection


(a) ASTM Standard P-189 Specification for Encapsulants for Friable Asbestos Containing Building Materials Proposal

3.2 Submittals

3.2.1 Notices: The Contractor shall notify federal, state, and local regulatory agencies in writing a minimum of 10 days in advance of any asbestos related work. Notifications shall be made by the Contractor as required by EPA National Emission Standards for Hazardous Air Pollutants (NESHAPS) Asbestos Regulations (40 CFR 61, Subpart M). Submit copies of notifications and documentation to PARS. If a project consists of multi-phases, with distinct start and stop dates, these shall be declared on the EPA Notice or individual notices shall be filed for each phase.

3.2.2 Permits and Licenses: Maintain current licenses and obtain applicable permits as required by federal and applicable state or local jurisdictions for the removal, transporting, disposal or other regulated activity relative to the abatement work of this contract. Submit copies of all state and local licenses and permits necessary to carry out the abatement work of this contract.

3.2.2.1 All asbestos containing waste is to be transported by an entity maintaining a current "Industrial waste hauler permit" specifically for asbestos-containing materials, as required for transporting of waste asbestos-containing materials to a disposal site.
4.0 MATERIALS AND EQUIPMENT

4.1 Materials

4.1.1 Caulking: High-grade rubber base caulk for masonry and/or for other materials.

4.1.2 Encapsulant: Product shall be rated as acceptable for use intended when field tested in accordance with ASTM Proposed Specification P-189 “Specification for Encapsulants for Friable Asbestos Containing Building Materials”. Use only materials that have a flame spread index of 25 or less when dry, when tested in accordance with ASTM E-84.

4.1.3 Impermeable Waste-Disposal Containers: Suitable to receive and retain any asbestos-containing or contaminated material until disposal at an approved site. The containers shall be labeled in accordance with OSHA Regulation 29 CFR 1910.1001 and 29 CFR 1926.1101. Containers must be both water-tight and air-tight.

4.1.4 Plastic Sheeting: Product Standard PS 17-69 and OSHA Regulation 29 CFR 1926.1101; Polyethylene plastic sheeting material 0.15 mm (6 mil) thickness for covering floors and walls, providing air locks, and sealing doors and windows; supply in appropriate widths to minimize seams. Must be flame-resistant material and must meet test criteria in NFPA 701. Reinforced sheeting is required for applications subject to wear and tear.

4.1.5 Surfactant (Wetting Agent): 50% polyoxyethylene ester and 50% polyoxyethylene ether, or approved equal, shall be mixed with water to provide a concentration of 2 ml surfactant to 1 liters of water, or manufacturer's recommended concentration.

4.1.6 Tape: Glass fiber or other tape capable of sealing joints of adjacent sheets of plastic sheeting and for attachment of plastic sheets to finished or unfinished surfaces of dissimilar materials under both dry and wet conditions, including use of amended water. Minimum tape width shall be 50 mm.


4.1.8 Waste Water Filters: Discharged liquids shall pass through a primary filter and the output shall be particles 20 microns or smaller. The secondary filter shall have output particles 5 microns or smaller.

4.2 Equipment

4.2.1 Respirators and Respirator Systems

4.2.1.1 Product Data: Must possess NIOSH and MSHA approval for each component in an assembly and/or for entire assembly.
5.0  PROJECT EXECUTION

5.1  Controlled Access to Site

5.1.1 Access to the abatement work area shall be restricted to the Contractor workers and authorized visitors as defined in these specifications.

5.1.2 Authorized visitors shall have access to the work site at all times following notification to the Contractor. The Contractor shall supply protective clothing and equipment for visitors as necessary, except for respirators which are to be provided by the visitor in accordance with Section 5.4 of this document.

5.1.3 The Contractor shall prominently post signs at all potential entry points to the abatement work area which clearly state: "Restricted Area Under Construction-Admittance by Special Permission Only - Protective Clothing Required Beyond This Point". Immediately inside entry point and outside critical barriers post a warning sign meeting specifications of OSHA 29 CFR 1910 and 1926. Suggested format is a sign of minimum size 508 mm by 356 mm displaying the following legend:

```
DANGER

ASBESTOS

CANCER AND LUNG DISEASE HAZARD

AUTHORIZED PERSONNEL ONLY

RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA
```

5.1.4 All workers and authorized visitors shall enter the abatement work area only through the abatement worker/equipment decontamination enclosure, in accordance with Section 5.3 of this document.

5.1.5 All workers and authorized visitors, before entering the abatement work area, shall read and be familiar with all posted regulations, personal protection requirements, and emergency procedures and exit routes.

5.1.6 The Contractor shall maintain a daily job site personnel log listing names and social security numbers of individuals who entered the abatement work area, and the times of entering and leaving the area.
5.2 Worker and Visitor Protection

5.2.1 No eating, drinking, smoking, or chewing gum is permitted within the abatement work area. The Contractor shall be informed of a "break area" where these activities are permitted.

5.2.2 Workers and Visitors shall be fully protected with respirators and protective clothing during any work which may disturb asbestos-containing materials and result in fiber release. Full protection is not required during pre-abatement inspections of the containment, while work is not being conducted.

5.2.3 Protective Clothing and Equipment: Provide workers and visitors with sufficient sets of protective full body clothing, to include full body coveralls with hood, boots (for workers) and footwear coverings (for workers and visitors), and gloves. Provide eye protection and hard hats as required by applicable safety regulations. Contaminated non-disposal clothing and footwear shall be left in the equipment room until the end of the asbestos abatement work, at which time such items shall be disposed of as asbestos waste, or shall be thoroughly cleaned of all asbestos or asbestos-containing material. The Contractor shall have at least three (3) sets of disposable protective full body clothing for authorized visitors for each work day. Provide storage facilities for visitors and workers for removed street clothing in the clean room.

5.2.3.1 Boots: Provide workers non-skid type work boots with protective shields as required by OSHA. Paint uppers of boots with red waterproof enamel paint as a permanent marking that the boots have been exposed to ACM abatement work areas. These boots are to be handled as asbestos-contaminated materials.

5.2.3.2 Hard Hats: Provide hard hats that meet ANSI Z89.1 for use where work is overhead, scaffolding is being used, or as otherwise required by OSHA. Label hats with same warning labels as required for ACM disposal bags.

5.2.3.3 Goggles: Provide goggles that meet ANSI Z87.1 as required by OSHA.

5.2.3.4 Gloves: Provide disposable work gloves for use in the abatement work area.

5.2.3.5 Coveralls with Hood: Provide disposable coveralls with hoods for use in the abatement work area.

5.2.3.6 Respirators: Provide workers with personally issued and marked respirator equipment approved by NIOSH/MSHA and, in accordance with these specifications, suitable for the asbestos exposure level in the abatement work area. Where respirators with disposable filters are employed, provide sufficient filters for replacement as necessary by the abatement worker, or as required by the applicable regulation. Authorized visitors must provide their own respirators,
with fresh filters or cartridges as necessary, to enter the abatement work area. These are minimum requirements. Section 5.4 of this document is to be consulted for more detail.

5.3 Abatement Work Area Entry and Exit Procedures

As the project will involve the non-friable removal of ACM, full decontamination procedures are not required. Should a decontamination system be installed and utilized, the following measures should be followed.

5.3.1 Each time the abatement work area is entered, remove all street clothes in the decontamination chamber and put on new disposable coveralls, new head cover, and a clean respirator.

5.3.2 Each time the abatement work area is exited, the following procedures shall be followed:

5.3.2.1 Before leaving the regulated area, employees and authorized visitors shall remove all gross contamination and debris from their protective clothing.

5.3.2.2 Personnel exiting the regulated area shall move directly to the decontamination area for doffing of PPE and washing.

5.4 Respiratory Protection

5.4.1 The Contractor is hereby advised that asbestos has been determined by the U.S. Government to be a CANCER-CAUSING AGENT. Provide workers with respirators [which, as a minimum, meet the requirements of OSHA 29 CFR 1926.1101] and protective clothing during all phases of the abatement work and until final visual inspection and approval of the completed work by PARS.

5.4.2 The Contractor shall select respirators from among those jointly approved as being acceptable for protection by the MSHA and the NIOSH under the provisions of 30 CFR Part 11.

5.4.3 The Contractor shall select and provide respirators, at no cost to the employee and shall ensure that the employee uses the respirator provided.

5.4.4 Instruct and train each worker involved in asbestos abatement or maintenance and repair of asbestos-containing materials in proper respiratory use and require that each worker always wear in the abatement work area a respirator, properly fitted on the face. The respirator shall be worn from the start of any operation which may cause airborne asbestos fibers until the abatement work area is completely decontaminated.

5.4.5 Allow an individual to use only those respirators for which training and fit-testing have been provided. Require that each time an air-purifying respirator is put on it be checked for fit with a positive and negative pressure fit test in accordance with the manufacturer's instructions or ANSI Z88.2.
5.4.6 For all jobs that involve the removal of thermal system insulation (TSI) or surfacing materials (OSHA definition of Class I work) the employer shall provide respirator protection in accordance with 29 CFR 1926.1101 (h) Table 1 - Respiratory Protection for Asbestos Fibers. This level of respiratory protection shall be maintained until the employer can produce a negative exposure assessment.

5.4.7 For all other abatement work, use respiratory protection appropriate for the fiber level encountered in the abatement work area or as required for other toxic or oxygen-deficient situations encountered. The level of respiratory protection which supplies an airborne fiber level inside the respirator, at the breathing zone of the wearer, at or below the permissible exposure limit (PEL) is the minimum level of protection allowed. (Table 1, Respiratory Protection for Asbestos Fibers, 29 CFR 1926.1101) Do not use single-use, disposable, or quarter-face respirators.

5.4.8 Authorized visitors are responsible for providing their own respirator and replacement filters and cartridges, with the exception of Type C which shall be provided by the Contractor, and for having been previously and properly trained fit-tested, for the respirator used.

5.4.9 For use with air-purifying respirators, provide, at a minimum, HEPA type filters certified by NIOSH and MSHA for protection against asbestos fibers. In addition, a chemical cartridge may be added, if required for protection against chemicals used on this job.

5.4.10 For use with powered air purifying respirators, supply a sufficient quantity of HEPA filters approved for asbestos, so workers can change filters at any time that flow through the face piece decreases to the level at which the manufacturer recommends filter replacement.

5.4.11 For supplied-air respirator systems, provide equipment capable of producing air used for breathing in Type "C" supplied air respiratory systems that meets or exceeds standards set for C.G.A. Type 1, Gaseous Air, Grade D. System must be certified by NIOSH/MSHA as an approved Type "C" respirator assembly operating in pressure demand mode with a positive pressure face-piece including as a minimum the following:

- Auxiliary backup system
- Escape air supply
- Backup air supply
- Warning Alarm Device
- Compressor Shut Down
- Compressor Motor (electric)
- Compressor Location (outside building)
- Air Intake
- After-Cooler
5.5 Air Monitoring: Stop Action and Clearance Levels

5.5.1 PARS will not be performing air monitoring to meet the Contractor's OSHA requirements for personal sampling or any other purpose. The Contractor is to conduct air monitoring required by OSHA for Contractor personnel.

5.5.2 Abatement Work Area Final Clearance:

5.5.2.1 Final work area clearance will involve a visual inspection by PARS to ensure all asbestos-containing materials, visible debris has been removed from the work areas, and final air clearance testing. The visual inspection will include the use of a leaf blower to identify hidden ACM debris from corners, underneath equipment, structural beams, and other work area locations debris may be located.

5.6 Initial Isolation of Abatement Work Area

5.6.1 The Contractor shall completely separate the abatement work area from other portions of the building, and the outside, by sealing all openings (doorways, elevator openings, corridor entrances, drains, ducts, grill, diffusers, skylights, etc.) with barriers of 0.15 mm (6 mil) polyethylene sheeting and tape, or by sealing cracks leading out of the abatement work area. Doorways and corridors which will not be used for passage during work must be sealed with 9.5 mm (3/8 inch) plywood, wood framing, and plastic sheeting with tape.

5.6.2 If it becomes necessary to shut down electric power to the enclosed abatement work area, then the Contractor shall provide temporary power and lighting and ensure safe installation of temporary power sources and equipment in accordance with NFPA 70 electric code requirements.

5.6.3 Arrange for the abatement work area to be locked during non-work hours. Install temporary doors with entrance type locksets that are key lockable from the outside and always unlocked and operable from the inside. Remove deadbolts and padlocks.

5.7 Preparation of Abatement Work Area and Temporary Enclosures

5.7.1 Clean all contaminated surfaces, equipment, and supplies with a HEPA-filtered vacuum cleaner or by wet wiping, as directed by PARS, prior to being moved or covered.

5.7.2 Before removal, clean by HEPA-filtered cleaner and/or by wet wiping, all electrical and mechanical items, (such as lighting fixtures, clocks, diffusers, registers, etc.) and general construction items (such as cabinets casework, door and window trim, moldings, etc.) which cover the surface of the abatement work as required to prevent interference with the abatement work.

5.7.3 Remove all removable equipment, supplies, and demolition debris that have been deemed by PARS to be uncontaminated, or completely cover with 2 layers of polyethylene sheeting, at least 0.15 mm (6 mil) in thickness, securely taped in place with duct tape. Such equipment, supplies, and demolition debris shall be considered outside the abatement work area unless covering plastic or seal is breached.
5.7.4 Clean all surfaces in abatement work area with a HEPA-filtered vacuum cleaner or by wet methods prior to installation of primary barrier.

5.7.5 All critical barriers, including ventilation openings (supply and exhaust), lighting fixtures, clocks, doorways, windows, speakers, and other openings into the abatement work area shall be individually sealed with 0.15 mm (6 mil) plastic sheeting and tape. Elevator doors, fire extinguisher cabinets, and all other penetration in the floor, walls, or ceiling shall be sealed in the abatement work area. If a temporary polyethylene/stud wall must be erected, that wall shall be treated as a critical barrier. The double layer polyethylene containment enclosure shall then be erected on that wall. Critical barriers shall be sealed prior to installation of primary barriers.

5.7.6 Install critical barrier walls of abatement work area including critical barrier sheet plastic with primary barrier of 2 layers of reinforced 0.15 mm (6 mil) polyethylene sheeting, mechanically supported and sealed with duct tape or spray-glue in the same manner as critical barrier sheet plastic. Size to minimize seams. Seams shall be staggered and separated by at least 600 mm (24 inches). Hardwood barriers may be required to ensure the competence and stability of the abatement work area walls.

5.7.7 Provide emergency exiting from the abatement work area as required by NFPA 101, Life Safety Code. Arrange exit door(s) so that it is secure from outside the abatement work area but permits exiting from the abatement work area. Mark outline of door on barriers with luminescent paint at least 250 mm (10 inches) wide. Hang a razor knife on a string beside outline. Post a sign identifying "EMERGENCY EXIT", using letters at least 150 mm (6 inch) high, inside outline with luminescent paint. Arrows shall be taped on the polyethylene wall covering at eye level and at floor level to indicate location of exits. At entrance to decontamination chamber, post building floor plan and escape routes, plus locations of nearest exist and phone numbers of SI security. Emergency lighting shall be required, in accordance with the Life Safety Code.

5.7.9 A 4.5 kg (5 lb.) ABC type portable fire extinguisher shall be located by each exit and clean room.

5.7.11 Provide GFCI protection for all electrical equipment.

5.7.12 Provide temporary lighting inside the decontamination enclosure facility.

5.8 Construction of Decontamination Enclosures
As the project will involve the non-friable removal of ACM, full decontamination procedures are not required. Should a decontamination system be installed and utilized, the following measures should be followed.

5.9 Air Circulation Inside Containment Barrier
5.9.1 Formula for Quantity of Air-Filtration Units: This project will include the non-friable removal of ACM, and as such a minimum work area air exchange is not required.
5.10 Placement of Air Filtration System Units
This project will include the non-friable removal of ACM, and as such a minimum work area air exchange is not required.

5.11 Pressure Differential Isolation
This project will include the non-friable removal of ACM, and as such a minimum work area air exchange is not required.

5.12 Pre-Abatement Inspection, Testing, and Approval
5.12.1 Pre-Abatement Testing Requirements: As a minimum, the Contractor shall make all arrangements and demonstrate satisfactory equipment operation and set-up for compliance with these specifications.

5.12.1.1 Demonstrate procedures for how workers will enter and exit the decontamination enclosure system, if applicable.

5.12.1.2 Demonstrate procedures for handling emergencies and for the prevention of contamination of surrounding areas.

5.12.1.3 Demonstrate how asbestos will be removed and bagged for transport. Identify procedures for hauling waste from the work area to the waste containers.

5.13 Maintenance of Containment Barrier and Enclosures
5.13.1 Ensure that the containment barrier, sealed doors, vents, etc., and plastic linings are effectively sealed and taped for the duration of the abatement work.

5.13.2 Repair damaged barriers and remedy defects immediately upon discovery. Visually inspect enclosure at the beginning of each work period.

5.13.3 Damaged or deteriorating materials shall not be used and shall be removed from the premises. Material that becomes exposed to and contaminated with asbestos shall be decontaminated or disposed of in accordance with the applicable regulations and special requirements.

5.13.4 Clean debris and residue from inside of the decontamination area on a daily basis.

5.13.5 Maintain floors as dry as possible to minimize slips and trips.

5.14 Removal of Asbestos-Containing Materials
5.14.1 Prohibited Work Practices. The following methods shall not be used for work related to or disturbing asbestos, regardless of exposure level:

5.14.1.1 High-speed abrasive disc saws that are not equipped with point of cut ventilation or enclosures with HEPA-filtered exhaust air.
5.14.1.2 Compressed air used to remove asbestos, or materials containing asbestos, unless the compressed air is used in conjunction with an enclosed ventilation system designed to capture the dust cloud created by the compressed air.

5.14.1.3 Dry sweeping, shoveling or other dry cleanup of dust and debris containing ACM and PACM.

5.14.1.4 Employee rotation as a means of reducing employee exposure to asbestos.

5.14.2 Methods of Compliance. The following engineering controls and work practices shall be used, at a minimum, for all asbestos tasks:

5.14.2.1 HEPA-filtered vacuum cleaners.

5.14.2.2 Non-friable removal methods.

5.14.2.3 Prompt cleanup and disposal.

5.14.3 The following work shall be done only after the decontamination area has been constructed and the area has been isolated as specified in the previous section, and arrangements have been made for disposing waste at an acceptable site.

5.14.4 Any torn or unsealed plastic sheeting shall be immediately repaired.

5.14.5 Non-Friable Removal

5.14.5.1 For the window caulk and glaze, the existing window systems will be disassembled and removed intact. The windows will be wrapped in two layers on 6-mil sheeting and labeled appropriately. Any residual caulk left in the window cavity will be adequately wetted and scraped from the building. All waste will be properly containerized and labeled prior to removal from the Site.

5.14.6 Gross removal of dust and debris from contaminated material, material containers, and equipment shall be accomplished in the containment barrier before removal to the equipment decontamination room for wet sponging before leaving the abatement work site.

5.15 Post Removal: Cleaning and Clearance

5.15.1 Provide general clean-up of abatement work area concurrent with the removal of all asbestos-containing materials. Do not permit accumulation of debris on workspace floor.

5.15.2 Do not perform dry dusting or dry sweeping.
5.15.3 Maintain the minimum required pressure differential of 0.50 mm of water inside the abatement work area enclosure at all times, and until PARS authorizes the Contractor to remove the enclosure.

5.15.4 Cleanup Sequence

(a) Remove all visible accumulations of asbestos-containing material and debris.

(b) Wet clean and HEPA-vacuum all surfaces in the abatement work area.

(c) Clean all equipment (excluding that which will be needed for further cleaning phases) used in the abatement work area and remove from abatement work area via the Equipment Decontamination Enclosure, if constructed.

5.15.5 Consider abatement work areas and all other decontaminated and cleaned areas clean when:

(a) All phases of clean-up have been completed and level of cleanliness is approved by PARS.

5.15.6 Dispose of debris from removal operation, used cleaning materials, unsalvageable materials used for sturdy barriers, and any other remaining materials. Consider the materials to be contaminated, and dispose of accordingly.

5.16 Post Clearance: Application of Lockdown Encapsulant

5.16.1 Apply encapsulant only when environmental conditions in the abatement work area are as required by the manufacturer's instructions and PARS.

5.16.2 Apply encapsulant with an airless spray gun with air pressure and nozzle orifice or as otherwise recommended by the encapsulant manufacturer.

5.17 Containment Barrier Removal

5.17.1 Equipment, machinery, scaffolding, tools, etc., within the abatement work area shall not be removed without first being thoroughly cleaned with amended water or in the case of delicate items susceptible to rust, an acceptable substitute.

5.17.2 After the abatement work area is found to be in compliance, the remaining sealed areas and exits are unsealed and the plastic sheeting, tape, and any other trash and debris are disposed of in sealable plastic bags and treated as asbestos waste. PARS will conduct a final walkthrough and document results.

5.18 Waste Disposal

5.18.1 Asbestos-contaminated waste that has been containerized shall be transported out of the abatement work area. Waste load-out procedures shall be performed by two teams. The team inside the abatement work area shall clean the outside of properly labeled
asbestos waste containers using HEPA vacuums and/or wet wiping, and place them into the waste load-out enclosure. No personnel from the inside team shall exit any further from the abatement work area. The team inside the waste load-out area (wearing protective clothing and respirators) shall retrieve the waste containers from the load-out enclosure, double-bag the waste and pass them to an uncontaminated area outside the enclosure. No unprotected personnel from the outside team shall enter this enclosure.

5.18.2 Water not disposed of with the asbestos-containing materials shall be filtered to remove asbestos fibers and debris before disposal into sanitary sewer.

5.18.3 Do not store containerized materials outside of the abatement work area. Take containers from the abatement work area directly to a sealed truck or dumpster.

5.18.4 Bulk and containerized asbestos waste shall be packed, labeled, and transported according to DOT Regulations 49 CFR 173.216 and 49 CFR 173.240. All removed ACM, plastic sheeting, tape, cleaning material, clothing, and all other disposable material or items used in the abatement work area shall be packed into double bagged sealable 0.15 mm (6 mil) plastic bags or double containerized with one bag and one drum. The bags shall be marked with the labels required by OSHA 29 CFR 1910.1001 and/or 1910.1200, and 1926.1101.

5.18.4.1 If the asbestos waste can reasonably be expected to damage double bagged 0.15 mm (6 mil) plastic bags, the following barrel decontamination procedures shall be followed.

(a) Line barrels with a 0.15 mm (6 mil) plastic liner to prevent leaking of contaminated material from the containers.

(b) As bags are moved out through the decontamination system, wet wipe bags to remove all contamination from them before they are moved into an uncontaminated space.

(c) Place bagged waste into appropriately labeled barrels for transport to landfill.

(d) After bagged contaminated waste is placed in barrels, seal lids on barrels.

5.18.4.2 Minimum labeling required:

First Label:
DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

Second Label:

=================================
PROVIDE IN ACCORDANCE WITH U.S. DEPARTMENT OF TRANSPORTATION REGULATION ON HAZARDOUS WASTE MARKING. 49 CFR PART 172, SUBPART D: "RQ ASBESTOS NA 2212". PROVIDE A "CLASS 9" LABEL, PER 49 CFR PART 172, SUBPART E.

5.18.4.3 The Contractor or other licensed asbestos waste hauler shall transport the approved sealed drums to an approved waste disposal site.

5.18.4.4 Allow only sealed plastic bags or impermeable containers to be deposited in landfill. Leave damaged, broken, or leaking plastic bags in the impermeable container and deposit entire barrel in landfill.

5.18.4.5 Ensure that there are no visible emissions to the outside air from site where materials and waste are deposited.

5.18.5 The Contractor shall submit a disposal certificate from the EPA approved landfill confirming final disposal in accordance with EPA standards and regulations before final payment. Retain receipts from landfill or processor for materials disposed off. At completion of hauling and disposal of each load, submit copy of waste manifest, chain of custody form, and landfill receipt to PARS.

5.19 Job Close-Out
5.19.1 The Contractor shall remove from the site all other debris and rubbish resulting from removal and disposal operations and the temporary construction of containment barriers and enclosures.
FIGURE 1

ACM LOCATION MAPS
APPENDIX A

PHOTO LOG
Photo 1: Westby Hall Exterior

Photo 2: Westby Hall Exterior
Vents to be removed
Photo 3: Westby Hall Exterior
Double Doors to be removed

Photo 4: Westby Hall Exterior
Photo 5: Westby Hall Interior

Photo 6: Asbestos-Containing Caulk
Photo 7: Asbestos-Containing Glaze

Photo 8: HVAC to be removed
### Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

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<th>Sample</th>
<th>Description</th>
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<td>Andrew Castellano</td>
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**Analyst(s):**
Andrew Castellano (10)

**Signatory:**
Benjamin Ellis, Laboratory Manager
or Other Approved Signatory

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**Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NVLAP Lab Code 101048-0, AIHA-LAP, LLC-IHLAP Lab 100194, NYS ELAP 10872, NJ DEP 03036, PA ID# 68-00367**

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