Rec Center HVAC Replacement

PROJECT MANUAL

PROJECT NO. 77420

7/2/18
REC CENTER HVAC REPLACEMENT

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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 who 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. The University
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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
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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
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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 who 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 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. The University
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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
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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 Purchases 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
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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.
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;
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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.
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 or 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 there from. 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.

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.
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 substi-tutions 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
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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 subsloits 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

c) failure of the contractor to keep informed of the work progressing at the site and failure to give notice of lack of progress or defective workmanship by others shall be construed as acceptance by him/her of the status of the work as being satisfactory for proper coordination and completion of the project.
d) the contractor shall be responsible to supervise, direct and manage the conduct of the construction and the efforts of all sub-contractors so as to deliver the project as required under the contract.

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...
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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.

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6.1.4 The contractor shall provide his/her own telephones. The general construction

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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 EMPLOYEE SHEDS

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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.
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, 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
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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.
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
the destroyed work and make good the damaged or disturbed work to the satisfaction of the University's project manager and the contracting officer or shall reimburse the contractor whose work he/she has destroyed, damaged or disturbed for the expense of replacing such work.

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
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
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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 scheduled 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.

9.2.7 Deleted

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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...
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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 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.

10.1.2 LEFT BLANK

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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10.2.2 LEFT BLANK

10.2.3 LEFT BLANK

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
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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10.5.2 LEFT BLANK

10.5.3 LEFT BLANK

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.
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
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care and shall only carry on such activities under the supervision of properly qualified personnel.

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>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>

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.

13.1.2 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 the 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
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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
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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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14.7 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)
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 expanded 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 office is satisfied that the contractor is employing workers provided by a union which provides evidence in accordance with standards prescribed by the affirmative action office 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
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 dos 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 opennings;
(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
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
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
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 there from, 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
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.
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, of 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
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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.
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.
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.
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
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 there from. 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 built 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
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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

c) failure of the contractor to keep informed of the work progressing at the site and failure to give notice of lack of progress or defective workmanship by others shall be construed as acceptance by him/her of the status of the work as being satisfactory for proper coordination and completion of the project

d) the contractor shall be responsible to supervise, direct and manage the conduct of the construction and the efforts of all sub-contractors so as to deliver the project as required under the contract

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.
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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 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
University's project manager, taken from the same points each month.

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.

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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 EMPLOYEE SHEDS

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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 Workmen 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.

6.9.10 Deleted

6.9.11 Deleted

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
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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, 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
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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...
the destroyed work and make good the damaged or disturbed work to the satisfaction of the University's project manager and the contracting officer or shall reimburse the contractor whose work he/she has destroyed, damaged or disturbed for the expense of replacing such work.

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
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
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
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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 scheduled 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
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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
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 accrues 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
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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
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care and shall only carry on such activities under the supervision of properly qualified personnel.

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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</thead>
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<tr>
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<td>5%</td>
</tr>
<tr>
<td>Over $1,000,000</td>
<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.

13.1.2 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.
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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 the 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 subcontractors, 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
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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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14.5.1 LEFT BLANK

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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 completed 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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14.7 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 office is satisfied that the contractor is employing workers provided by a union which provides evidence in accordance with standards prescribed by the affirmative action office 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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GENERAL CONDITIONS

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
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:

Rec Center HVAC Replacement
PROJECT NO. 77420

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.


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 referrals 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 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

Rowan University
Rec Center HVAC Replacement
Rowan Project No. 77420 CONSTRUCTION CONTRACT

7/2/18 Section III - 7
Exhibit A

Rowan University Invitation for Bid

PROJECT MANUAL

INSTRUCTIONS TO BIDDERS AND GENERAL CONDITIONS

Section I Instructions to Bidders dated July 25, 2017 Pages 1 through 7
Section II General Conditions dated July 25, 2107 Pages 1 through 60
Section III Construction Contract dated July 25, 2107 Pages 1 through 9
  Allowance Authorization Form dated October 2010 Page 1
  Allowance Charge Request Form dated September 2010 Page 1
  Request for Information Form --- Page 1
  Change Order Request Form --- Page 1
  Change Order Form --- Page 1
  Hourly Labor Rate Breakdown Form --- Page 1
  Daily Job Report Form --- Page 1
  Application and Certificate for Payment Form (AIA G702) --- Pages 1 through 2
  Attachment to G702 Certification --- Page 1 through 2
  Contractor’s Partial or Final Release --- Page 1
  And Waiver of Liens
  Rowan Tax Exempt Letter --- Page 1
  Consent of Surety Company to Final Payment (AIA G707) --- Page 1

DIVISION 01 GENERAL REQUIREMENTS DATED July 25, 2017

Section 011000 Summary of Work 011000-1 to 011000-4
Section 011400 Work Restrictions 011400-1 to 011400-3
Section 012200 Unit Prices 012200-1
Section 012300 Alternates 012300-1 to 012300-2
Section 012400 Procedures and Controls 012400-1 to 012400-17
Section 012500 Contract Modification Procedures 012500-1 to 012500-5
Section 012900 Payment Procedures 012900-1 to 012900-6
Section 013100 Coordination 013100-1 to 013100-3
Section 013200 Construction Progress Schedule 013200-1 to 013200-6
Section 013300 Submittal Procedures 013300-1 to 013300-15
Section 014000 Quality Control Requirements 014000-1 to 014000-4
Section 014100 Testing Services 014100-1 to 014100-4
Section 014200 Reference Standards 014200-1 to 14200-5
Section 015000 Construction Facilities & Temporary Controls 015000-1 to 015000-8
Section 017700 Contract Closeout 017700-1 to 017700-9
Section 017820 Operation and Maintenance Data 017820-1 to 017820-8
Section 018200 Demonstration and Training 018200-1 to 018200-5

TECHNICAL SPECIFICATIONS

Rowan University
Rec Center HVAC Replacement
Rowan Project No. 77420 CONSTRUCTION CONTRACT

7/2/18 Section III - 8
DIVISION XX
Section XXXXXX

DRAWINGS DATED
ARCHITECTURAL
MECHANICAL
ELECTRICAL
PLUMBING

END OF SECTION
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:

Rec Center HVAC Replacement
PROJECT NO. 77420

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.


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 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

Rowan University
Rec Center HVAC Replacement
Rowan Project No. 77420 CONSTRUCTION CONTRACT 7/2/18
Section III - 7
# Exhibit A

Rowan University Invitation for Bid

## PROJECT MANUAL

### INSTRUCTIONS TO BIDDERS AND GENERAL CONDITIONS

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Date</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Instructions to Bidders</td>
<td>July 25, 2017</td>
<td>1 through 7</td>
</tr>
<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>
<td>1 through 9</td>
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<td>Allowance Authorization Form</td>
<td>October 2010</td>
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<td>Allowance Charge Request Form</td>
<td>September 2010</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></td>
<td>Application and Certificate for</td>
<td></td>
<td>1 through 2</td>
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<td></td>
<td>Payment Form (AIA G702)</td>
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<td>Attachment to G702 Certification</td>
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<td>For Payment</td>
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<td>Contractor’s Partial or Final Release</td>
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<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</td>
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**DIVISION 01 GENERAL REQUIREMENTS DATED July 25, 2017**

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
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<tbody>
<tr>
<td>011000</td>
<td>Summary of Work</td>
<td>011000-1 to 011000-4</td>
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<td>011400</td>
<td>Work Restrictions</td>
<td>011400-1 to 011400-3</td>
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<td>Unit Prices</td>
<td>012200-1</td>
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<td>012300</td>
<td>Alternates</td>
<td>012300-1 to 012300-2</td>
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<td>012400</td>
<td>Procedures and Controls</td>
<td>012400-1 to 012400-17</td>
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<td>012500</td>
<td>Contract Modification Procedures</td>
<td>012500-1 to 012500-5</td>
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<td>012900</td>
<td>Payment Procedures</td>
<td>012900-1 to 012900-6</td>
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<td>013100</td>
<td>Coordination</td>
<td>013100-1 to 013100-3</td>
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<td>013200</td>
<td>Construction Progress Schedule</td>
<td>013200-1 to 013200-6</td>
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<td>Submittal Procedures</td>
<td>013300-1 to 013300-15</td>
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<td>014000</td>
<td>Quality Control Requirements</td>
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<td>Testing Services</td>
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<td>014200</td>
<td>Reference Standards</td>
<td>014200-1 to 14200-5</td>
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<td>015000</td>
<td>Construction Facilities &amp; Temporary Controls</td>
<td>015000-1 to 015000-8</td>
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<td>017700</td>
<td>Contract Closeout</td>
<td>017700-1 to 017700-9</td>
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<td>017820</td>
<td>Operation and Maintenance Data</td>
<td>017820-1 to 017820-8</td>
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<tr>
<td>018200</td>
<td>Demonstration and Training</td>
<td>018200-1 to 018200-5</td>
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**TECHNICAL SPECIFICATIONS**

Rowan University
Rec Center HVAC Replacement
Rowan Project No. 77420
CONSTRUCTION CONTRACT

7/2/18
Section III - 8
DIVISION XX
Section XXXXXX

**DRAWINGS DATED**

ARCHITECTURAL
MECHANICAL
ELECTRICAL
PLUMBING

END OF SECTION
# REQUEST FOR INFORMATION

<table>
<thead>
<tr>
<th>RFI No:</th>
<th>Date Submitted:</th>
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<td>Rowan Project No./Description:</td>
<td>Requested Response Date:</td>
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<td>Actual Response Date:</td>
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<table>
<thead>
<tr>
<th>Rowan Project Manager:</th>
<th>Submitted to:</th>
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<tbody>
<tr>
<td>Submitted to:</td>
<td>Company:</td>
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</table>

**Contract Document Reference:**

## RFI DISCUSSION
Individually number each separate topic or question

<table>
<thead>
<tr>
<th>Submitted by (Name &amp; Company):</th>
<th>Title:</th>
<th>Date:</th>
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</thead>
</table>

## RFI RESPONSE

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<th>Answered by (Name &amp; Company):</th>
<th>Title:</th>
<th>Date:</th>
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</table>
CHANGE ORDER REQUEST

OWNER          ARCHITECT          CONTRACTOR          FIELD          OTHER

PROJECT: (name, address)                 CHANGE ORDER REQUEST NUMBER:

DATE OF ISSUANCE:

ARCHITECT’S PROJECT NO:

CONTRACT FOR:

OWNER: (name, address)                  CONTRACT DATE:

ARCHITECT: (name, address)               FROM CONTRACTOR: (name, address)

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)
**CHANGE ORDER REQUEST**

<table>
<thead>
<tr>
<th>PROJECT: (name, address)</th>
<th>CHANGE ORDER REQUEST NUMBER:</th>
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<tbody>
<tr>
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<td>DATE OF ISSUANCE:</td>
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<td>ARCHITECT'S PROJECT NO:</td>
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<tr>
<td></td>
<td>CONTRACT FOR:</td>
</tr>
<tr>
<td>OWNER: (name, address)</td>
<td>CONTRACT DATE:</td>
</tr>
<tr>
<td>ARCHITECT: (name, address)</td>
<td>FROM CONTRACTOR: (name, address)</td>
</tr>
</tbody>
</table>

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:

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

The original (Contract Sum) (Guaranteed Maximum Price) was
New change by previously authorized Change Orders
The (Contract Sum) (Guaranteed Maximum Price) prior to this Change Order was
The (Contract Sum) (Guaranteed Maximum Price) will be (increased) (decreased)
(unchanged) by this Change Order in the amount of
The new (Contract Sum) (Guaranteed Maximum Price) including this Change Order will be

The Contract Time will be (increased) (decreased) (unchanged) by
The date of Substantial Completion as of the date of this Change Order therefore is

NOTE: This summary does not reflect changes in the Contract Sum, Contract Time or Guaranteed Maximum Price which have been authorized by Construction Change Directive.

Rowan University

ARCHITECT

CONTRACTOR

201 Mullica Hill Road

Glassboro, NJ 08028-1701

BY ________________________________    BY _______________________

DATE____________________________   DATE__________

BY__________________________________

DATE________________________________
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_____________

<table>
<thead>
<tr>
<th>Item</th>
<th>(%)</th>
<th>(S) Straight Time (a)</th>
<th>(1 ½ x) (S) Overtime (b)</th>
<th>(S) Premium Cost (b-a)</th>
<th>(2x) (S) Overtime (c)</th>
<th>(S) Premium Cost (c-a)</th>
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<tr>
<td>1. Base Rate *</td>
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<td>2. Overhead (on base rate only)</td>
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<td>(d) XXXXXX</td>
<td>(d) XXXXXX</td>
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<td>3. Profit (on base rate only)</td>
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<td>(d) XXXXXX</td>
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<td>5. Federal Unemployment Tax</td>
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<td>6. State Unemployment Tax</td>
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<td>8. Pension</td>
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<td>9. Vacation Fund</td>
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<td>10. Annuity Fund</td>
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<td>XXXXXX</td>
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<td>11. Associate Dues</td>
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<td>12. Paid Holiday</td>
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<td>13. Workmen’s Compensation</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](http://lwd.dol.state.nj.us)
## DAILY JOB REPORT

### Project #

| DATE: | ________ |
| WEATHER CONDITIONS: |  |
| VISITORS: |  |

<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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<tr>
<th>MATERIALS DELIVERED:</th>
<th>EQUIPMENT ONSITE:</th>
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| PROBLEMS/STATUS/CAUSES FOR DELAY: |  |
|-----------------------------------|  |

| NOTEWORTHY PHONE CALLS: |  |
|-------------------------|  |
APPLICATION AND CERTIFICATE FOR PAYMENT

TO OWNER: PROJECT:

FROM CONTRACTOR: VIA ENGINEER:

AIA DOCUMENT G702

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

CONTRACTOR'S APPLICATION FOR PAYMENT

CHANGE ORDER SUMMARY

<table>
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<tr>
<th>Change Orders approved in previous months by owner</th>
<th>ADDITIONS</th>
<th>DEDUCTIONS</th>
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<tbody>
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<td>TOTAL</td>
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</table>

Approved This Month
Number  Date Approved

APPLICATION

Appication is made for Payment, as shown below, in connection with the Contract.

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}

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.

State: ____________________________ County of: ____________________________
Subscribed and sworn to before me this ______ day of 2010
Notary Public: ____________________________
My Commission expires: ____________________________

AMOUNT CERTIFIED...........................................____ $____

{Attach explanation if amount certified differs from the amount applied for.}

ARCHITECT:

By: ____________________________ Date: ________________

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.
<table>
<thead>
<tr>
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<th>B DESCRIPTION OF WORK</th>
<th>C QUANTITY</th>
<th>D UNIT OF MEASURE</th>
<th>E SCHEDULED VALUE</th>
<th>F WORK COMPLETED</th>
<th>G MATERIALS PREVIOUSLY STORED NOT IN OR D IR</th>
<th>H</th>
<th>I BALANCE TO COMPLETE C - G</th>
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</table>
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
CONTRACTOR’S PARTIAL OR FINAL RELEASE AND WAIVER OF LIENS

OWNER:  

OWNER’S AGENT:  

PROJECT:  

CONTRACT FOR:  

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 _________________

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
Moorland House
PO Box 112
Trenton, NJ 08625-0112

May 4, 2011

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

Re: Tax Exempt Status of Rowan University
Federal Tax ID: 33-764-839

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-9, 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., where the University or its authorized representative conducting University business, is the purchaser, user or consumer. Further, should the United States or any other state grant an exemption from certain taxes to the State of New Jersey, Rowan University, as an arm of the State, is entitled to such consideration.

Sincerely yours,

PAULA T. FOR
ATTORNEY GENERAL OF NEW JERSEY

[Signature]
Deputy Attorney General

Chief Financial Officer
Bole Hall
201 Mullica Hill Road
Glassboro, NJ 08028-1701

856-256-4127
856-256-4443 fax
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
(Surety Company)

SURETY COMPANY,

on bond 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 (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

Signature of Authorized Representative

Attest:
(Seal):

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.
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. Rec Center
2. Owner: Rowan University

B. Architect Identification: The Contract Documents were prepared for Project by:

Burns Engineering Inc.
Richard Depenbrock, P.E.
Two Commerce Square
2001 Market Street, Suite 600
Philadelphia, PA 19103

C. The Work consists of the following:

1. The Work requires the complete replacement of the Recreation Center Natatorium dehumidification and HVAC system. The replacement dehumidification system will have nearly twice the capacity of the existing system.
2. The existing supply and return ductwork and rooftop dehumidification unit are to be removed in their entirety.
3. The Work includes all roofing work associated with the replacement of supply and return ductwork on the roof and the dehumidification equipment.
4. The existing roofing structure shall be reinforced to accommodate the larger rooftop dehumidification unit.
5. The new dehumidification unit is to be installed onto a new roof curb and is to be attached to its associated dry cooler which is supported by an equipment rail.
6. Electrical power to existing equipment is to be removed. New electrical work includes the replacement of circuit breakers in the building’s MDP and the installation of new conduit and wiring to support the new HVAC equipment.
7. Portions of the existing heating hot water and pool heating piping serving the dehumidification equipment are to be removed and extended to the new equipment.
8. New aluminum ductwork and associated insulation and supports are to be installed from the new rooftop equipment, across the roof and into the natatorium.
9. New fabric air distribution ductwork shall be provided above the deck of the pool.
10. The new dehumidification unit controls shall be integrated into the existing DDC building automation system to permit monitoring and control of the system from the University’s central station. All miscellaneous automatic temperature control work shall be included to complete the installation of the new equipment.
11. Fire sprinkler modifications shall be provided to accommodate the new duct configuration. The contractor shall include a fire watch whenever the fire sprinkler system is not operational.
12. The smoke detector currently serving the pool HVAC unit shall be replaced with a new detector installed into the new ductwork. The duct smoke detector shall be interlocked with the new HVAC unit to shut down all fans upon the detection of smoke.
13. The contractor shall perform his work to minimize the disruption of the operations of the facility.
14. All patching and painting shall be provided to restore finishes exposed by the work to match adjacent construction.
15. The Contractor shall provide commissioning, testing and balancing of new systems.

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 Rowans 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, Rowans 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 the driveways and entrances.
   b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
   c. Contractor may NOT have a trash dumpster nor 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 7/30/18.
2. ALL submittals to Architect: one (1) week after Notice to Proceed.
3. Architect return of reviewed of submittals by: one (1) week after receipt.
5. Final Completion of work on site by 1/14/19. All construction including punch list work will be completed by this date.
6. Final Completion by 2/11/19. 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, ½ 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: Confining construction operations to weekdays (Monday through Friday) from 8:00 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, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

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. NONE ARE REQUIRED FOR THIS PROJECT.

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 3 - EXECUTION

3.1 SCHEDULE OF ADD – ALTERNATES

A. Add Alternate No. 1: Remove and dispose of the existing scoreboard from the location noted on the drawings. Remove all conduit and wiring associated with the scoreboard to be removed. Remove these items back to their source. Patch the walls and any finishes damaged and exposed by the removal of the scoreboard and associated items. Paint the entire wall from floor to ceiling and corner to corner where the scoreboard was located to match the existing wall color.

3.2 SCHEDULE OF DEDUCT – ALTERNATES

A. NONE

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 contact, 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
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 precedent. 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
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, attic, 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
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

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Architect issue such requests. In any event a detailed description of proposed changes in the Work will be submitted to the contractor that may require adjustment to the Contract Sum. THERE WILL BE NO ADJUSTMENTS TO TIME FOR ANY GIVEN CHANGE ORDER REQUESTED. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Proposal 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 architect.

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, 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
(1) sub-contractor for the purpose of mark-ups.

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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PERFORMANCE OF CHANGE ORDER WORK

A. A contractor who performs any scope of work associated with a change order or allowance (if allowances are applicable on a given project) without receiving proper approval in accordance with all contract document requirements hereof does so at its own risk. The Contractor shall have waived any and all claims for additional compensation related to said changes or conditions encountered.

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.
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
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.

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 Sections.

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 sepias 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 AutoCcad 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 expediter; 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 metes 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 proceed 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 proceed 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 contact 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. "Directed": 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 Architect's 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. Cost of temporary electric power usage is the Contractor's 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. 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. 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. 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 Owner’s 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 017700– CONTRACT CLOSEOUT

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 SPECIFICAITONS 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. $500.00 per day for the first thirty (30) days beyond substantial completion.
2. $1000.00 per day for each day beyond the thirty (30) days 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.

   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-detracting 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-surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances. Remove glazing compounds and other substances that are vision-detracting materials. Replace chipped or broken glass and other damaged transparent materials.
   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) 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;
f. Removal of temporary floor protections; clean, wash or otherwise treat and/or polish all finished floors as directed;
g. 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;
h. 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.
B. 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, 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
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.

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 055000 - METAL FABRICATIONS

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. Steel framing and supports for mechanical and electrical equipment.
   2. Joist reinforcement.
   3. Miscellaneous steel.

1.3 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.4 ACTION SUBMITTALS

A. Shop Drawings: Show fabrication and installation details. Provide Shop Drawings for the following:
   1. Steel framing and supports for mechanical and electrical equipment.
   2. Steel framing and supports for applications where framing and supports are not specified in other Sections.
   3. Miscellaneous steel

1.5 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Welding Qualifications: Qualify procedures and personnel according to the following:
   1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
   2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
   3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."
1.6 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. W-Shapes: ASTM A 992/A 992M, or ASTM A 572/A 572M, Grade 50.

C. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

D. Stainless-Steel Sheet, Strip, and Plate: ASTM A 240/A 240M or ASTM A 666, Type 304.

E. Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.

F. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.

G. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.
   1. Size of Channels: As indicated.
   2. Material: Galvanized steel, ASTM A 653/A 653M, structural steel, Grade 33, with G90 coating; 0.108-inch nominal thickness.

2.2 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

   1. Provide stainless-steel fasteners for fastening aluminum.
   2. Provide stainless-steel fasteners for fastening stainless steel.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 325, Type 3 (ASTM A 325M, Type 3); with hex nuts, ASTM A 563, Grade C3 (ASTM A 563M, Class 8S3); and, where indicated, flat washers.

C. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.

   1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

D. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches (41 by 22 mm) by length indicated with anchor straps or studs not less than 3 inches (75 mm) long at not more than 8 inches (200 mm) o.c. Provide with
temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.

2.3 MISCELLANEOUS MATERIALS

A. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

B. Water-Based Primer: Emulsion type, anticorrosive primer for mildly corrosive environments that is resistant to flash rusting when applied to cleaned steel, complying with MPI#107 and compatible with topcoat.

C. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.

D. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

F. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.4 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove welding flux immediately.
   4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

2.5 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
   1. Fabricate units from slotted channel framing where indicated.

C. Galvanize miscellaneous framing and supports where indicated.

2.6 FINISHES, GENERAL

A. Finish metal fabrications after assembly.

B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.7 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.
   1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

B. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.

C. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:
   3. Other Items: SSPC-SP 3, "Power Tool Cleaning."

D. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
   1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
2.8 ALUMINUM FINISHES

A. As-Fabricated Finish: AA-M12.


PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

3.3 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.

B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint.
C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION 055000
SECTION 230517 - SLEEVES AND SLEEVE SEALS FOR HVAC PIPING

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. Sleeves.
   2. Silicone sealants.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 SLEEVES

A. Galvanized-Steel Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

2.2 SILICONE SEALANTS

A. Silicone, S, NS, 25, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant, ASTM C 920, Type S, Grade NS, Class 25, use NT.

B. Silicone, S, P, 25, T, NT: Single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade P, Class 25, Uses T and NT. Grade P Pourable (self-leveling) formulation is for opening in floors and other horizontal surfaces that are not fire rated.

C. Silicone Foam: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION

A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.

B. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.
   1. Permanent sleeves are not required for holes in slabs formed by molded-PE or -PP sleeves.
   2. Cut sleeves to length for mounting flush with both surfaces.
      a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.
   3. Using silicone sealant, seal space outside of sleeves in slabs and walls without sleeve-seal system.

C. Install sleeves for pipes passing through interior partitions.
   1. Cut sleeves to length for mounting flush with both surfaces.
   2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
   3. Seal annular space between sleeve and piping or piping insulation; use sealants appropriate for size, depth, and location of joint.

D. Fire-Resistance-Rated Penetrations, Horizontal Assembly Penetrations, and Smoke-Barrier Penetrations: Maintain indicated fire or smoke rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with fire- and smoke-stop materials.

END OF SECTION 230517
SECTION 230519 - METERS AND GAGES FOR HVAC PIPING

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. Liquid-in-glass thermometers.
2. Thermowells.
3. Dial-type pressure gages.
4. Gage attachments.
5. Test plugs.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of meter and gage.

PART 2 - PRODUCTS

2.1 LIQUID-IN-GLASS THERMOMETERS

A. Metal-Case, Compact-Style, Liquid-in-Glass Thermometers:

2. Case: Cast aluminum; 6-inch nominal size.
3. Case Form: Back angle unless otherwise indicated.
4. Tube: Glass with magnifying lens and blue or red organic liquid.
5. Tube Background: Nonreflective aluminum with permanently etched scale markings graduated in deg F.
6. Window: Glass or plastic.
7. Stem: Aluminum or brass and of length to suit installation.
   a. Design for Thermowell Installation: Bare stem.
9. Accuracy: Plus or minus 1 percent of scale range or one scale division, to a maximum of 1.5 percent of scale range.
2.2 THERMOWELLS

A. Thermowells:
2. Description: Pressure-tight, socket-type fitting made for insertion in piping tee fitting.
3. Material for Use with Copper Tubing: CNR or CUNI.
4. Material for Use with Steel Piping: CRES.
5. Type: Stepped shank unless straight or tapered shank is indicated.
6. External Threads: NPS 1/2, NPS 3/4, or NPS 1, ASME B1.20.1 pipe threads.
7. Internal Threads: 1/2, 3/4, and 1 inch, with ASME B1.1 screw threads.
8. Bore: Diameter required to match thermometer bulb or stem.
9. Insertion Length: Length required to match thermometer bulb or stem.
10. Lagging Extension: Include on thermowells for insulated piping and tubing.
11. Bushings: For converting size of thermowell's internal screw thread to size of thermometer connection.

B. Heat-Transfer Medium: Mixture of graphite and glycerin.

2.3 DIAL-TYPE PRESSURE GAGES

A. Direct-Mounted, Metal-Case, Dial-Type Pressure Gages:
2. Case: Liquid-filled type(s); cast aluminum or drawn steel; 4-1/2-inch nominal diameter.
3. Pressure-Element Assembly: Bourdon tube unless otherwise indicated.
4. Pressure Connection: Brass, with NPS 1/4, ASME B1.20.1 pipe threads and bottom-outlet type unless back-outlet type is indicated.
5. Movement: Mechanical, with link to pressure element and connection to pointer.
8. Window: Glass.
9. Ring: Metal.
10. Accuracy: Grade A, plus or minus 1 percent of middle half of scale range.

2.4 GAGE ATTACHMENTS

A. Snubbers: ASME B40.100, brass; with NPS 1/4, ASME B1.20.1 pipe threads and porous-metal-type surge-dampening device. Include extension for use on insulated piping.

B. Valves: Brass ball, with NPS 1/4, ASME B1.20.1 pipe threads.

2.5 TEST PLUGS

A. Description: Test-station fitting made for insertion in piping tee fitting.

B. Body: Brass or stainless steel with core inserts and gasketed and threaded cap. Include extended stem on units to be installed in insulated piping.

C. Thread Size: NPS 1/4, ASME B1.20.1 pipe thread.

D. Minimum Pressure and Temperature Rating: 500 psig at 200 deg F.
E. Core Inserts: Chlorosulfonated polyethylene synthetic and EPDM self-sealing rubber.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install thermowells with socket extending to center of pipe and in vertical position in piping tees.

B. Install thermowells of sizes required to match thermometer connectors. Include bushings if required to match sizes.

C. Install thermowells with extension on insulated piping.

D. Fill thermowells with heat-transfer medium.

E. Install direct-mounted thermometers in thermowells and adjust vertical and tilted positions.

F. Install remote-mounted thermometer bulbs in thermowells and install cases on panels; connect cases with tubing and support tubing to prevent kinks. Use minimum tubing length.

G. Install duct-thermometer mounting brackets in walls of ducts. Attach to duct with screws.

H. Install direct-mounted pressure gages in piping tees with pressure gage located on pipe at the most readable position.

I. Install remote-mounted pressure gages on panel.

J. Install valve and snubber in piping for each pressure gage for fluids (except steam).

K. Install valve and syphon fitting in piping for each pressure gage for steam.

L. Install test plugs in piping tees.

M. Install flow indicators in piping systems in accessible positions for easy viewing.

N. Assemble and install connections, tubing, and accessories between flow-measuring elements and flowmeters according to manufacturer’s written instructions.

O. Install flowmeter elements in accessible positions in piping systems.

P. Install wafer-orifice flowmeter elements between pipe flanges.

Q. Install differential-pressure-type flowmeter elements, with at least minimum straight lengths of pipe, upstream and downstream from element according to manufacturer’s written instructions.

R. Install permanent indicators on walls or brackets in accessible and readable positions.

S. Install connection fittings in accessible locations for attachment to portable indicators.

T. Mount thermal-energy meters on wall if accessible; if not, provide brackets to support meters.

U. Install thermometers in the following locations:
1. Inlet and outlet of each hydronic coil in air-handling units.
2. Two inlets and two outlets of each hydronic heat exchanger.

V. Install pressure gages in the following locations:

1. Suction and discharge of each pump.

3.2 CONNECTIONS

A. Install meters and gages adjacent to machines and equipment to allow space for service and maintenance of meters, gages, machines, and equipment.

3.3 ADJUSTING

A. After installation, calibrate meters according to manufacturer's written instructions.
B. Adjust faces of meters and gages to proper angle for best visibility.

3.4 THERMOMETER SCHEDULE

A. Thermometers at inlet and outlet of each hydronic coil in air-handling units and built-up central systems shall be the following:
B. Thermometer stems shall be of length to match thermowell insertion length.

3.5 THERMOMETER SCALE-RANGE SCHEDULE

A. Scale Range for Pool Water Heating Piping: 0 to 150 deg F.
B. Scale Range for Heating, Hot-Water Piping: 30 to 240 deg F.

3.6 PRESSURE-GAGE SCHEDULE

A. Pressure gages at suction and discharge of each pump shall be one of the following:
   1. Liquid-filled, direct-mounted, metal case.

3.7 PRESSURE-GAGE SCALE-RANGE SCHEDULE

A. Scale Range Pool Water Heating Piping: 0 to 100 psi.
B. Scale Range for Heating, Hot-Water Piping: 0 to 100 psi.

END OF SECTION 230519
SECTION 230529 - HANGERS AND SUPPORTS FOR HVAC PIPING

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. Metal pipe hangers and supports.
   2. Trapeze pipe hangers.
   3. Metal framing systems.
   4. Thermal-hanger shield inserts.
   5. Fastener systems.

B. Related Sections:
   1. Section 055000 "Metal Fabrications" for structural-steel shapes and plates for trapeze hangers for pipe and equipment supports.
   2. Section 233113 "Metal Ducts" for duct hangers and supports.

1.3 DEFINITIONS

A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

1.4 ACTION SUBMITTALS

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

1.5 INFORMATIONAL SUBMITTALS

A. Welding certificates.

1.6 QUALITY ASSURANCE

A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.
PART 2 - PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS

A. Carbon-Steel Pipe Hangers and Supports:
   1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
   2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
   3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
   4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.

B. Copper Pipe Hangers:
   1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.

2.2 METAL FRAMING SYSTEMS

A. MFMA Manufacturer Metal Framing Systems:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. B-line, an Eaton business.
      b. Flex-Strut Inc.
      c. G-Strut.
      d. Haydon Corporation.
      e. Thomas & Betts Corporation; A Member of the ABB Group.
      f. Unistrut; Part of Atkore International.
   2. Description: Shop- or field-fabricated pipe-support assembly for supporting multiple parallel pipes.
   4. Channels: Continuous slotted steel channel with inturned lips.
   5. Channel Nuts: Formed or stamped steel nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.

2.3 THERMAL-HANGER SHIELD INSERTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Carpenter & Paterson, Inc.
   3. PHS Industries, Inc.
   4. Pipe Shields, Inc.; a subsidiary of Piping Technology & Products, Inc.
   5. Piping Technology & Products, Inc.
6. Rilco Manufacturing Co., Inc.

B. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with 100-psig ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength and vapor barrier.

C. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate with 100-psig, ASTM C 552, Type II cellular glass with 100-psig minimum compressive strength.

D. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.

E. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.

F. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.4 FASTENER SYSTEMS

A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

B. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

2.5 EQUIPMENT SUPPORTS

A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.6 MISCELLANEOUS MATERIALS

A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.

B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.

2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.
B. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.

C. Fastener System Installation:
   1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer’s operating manual.
   2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer’s written instructions.

D. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.


F. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

G. Install lateral bracing with pipe hangers and supports to prevent swaying.

H. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

I. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

J. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

K. Insulated Piping:
   1. Attach clamps and spacers to piping.
      a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
      b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
      c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
   2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
      a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
   3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
      a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
4. Shield Dimensions for Pipe: Not less than the following:
   a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
   b. NPS 4: 12 inches long and 0.06 inch thick.

5. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.2 EQUIPMENT SUPPORTS
   A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
   B. Grouting: Place grout under supports for equipment and make bearing surface smooth.
   C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.3 METAL FABRICATIONS
   A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
   B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
   C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:
      1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
      2. Obtain fusion without undercut or overlap.
      3. Remove welding flux immediately.
      4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.
      5. Re-galvanize, if galvanizing is affected.

3.4 ADJUSTING
   A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
   B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.5 PAINTING
   A. Paint all exposed hangers and supports with one coat of primer and two finish coats to match existing adjacent color and finish.
   B. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.

C. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Section 099100 “Painting”.

D. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.6 HANGER AND SUPPORT SCHEDULE

A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.

B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use carbon-steel pipe hangers and supports, metal trapeze pipe hangers and attachments for general service applications.

F. Use copper-plated pipe hangers and copper attachments for copper piping and tubing.

G. Use padded hangers for piping that is subject to scratching.

H. Use thermal-hanger shield inserts for insulated piping and tubing.

I. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

   1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
   2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg F, pipes NPS 4 to NPS 24, requiring up to 4 inches of insulation.
   3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.
   4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes NPS 1/2 to NPS 24 if little or no insulation is required.
   5. Pipe Hangers (MSS Type 5): For suspension of pipes NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
   6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated, stationary pipes NPS 3/4 to NPS 8
   7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8
   8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8
   9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8
  10. Split Pipe Ring with or without Turnbuckle Hangers (MSS Type 11): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 8
11. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 3.
12. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
14. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.
15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
16. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes NPS 2-1/2 to NPS 36 if vertical adjustment is required, with steel-pipe base stanchion support and cast-iron floor flange.
17. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30, from two rods if longitudinal movement caused by expansion and contraction might occur.
18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes NPS 2-1/2 to NPS 24, from single rod if horizontal movement caused by expansion and contraction might occur.
19. Complete Pipe Rolls (MSS Type 44): For support of pipes NPS 2 to NPS 42 if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes NPS 2 to NPS 24 if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes NPS 2 to NPS 30 if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.

J. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.

K. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.

L. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar joist construction, to attach to top flange of structural shape.
3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
6. C-Clamps (MSS Type 23): For structural shapes.
7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
11. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
12. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:
   a. Light (MSS Type 31): 750 lb
   b. Medium (MSS Type 32): 1500 lb
   c. Heavy (MSS Type 33): 3000 lb
13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.

M. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.

N. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches
3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41, roll hanger with springs.
4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from hanger.
6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from base support.
7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from trapeze support.
8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:
a. Horizontal (MSS Type 54): Mounted horizontally.
b. Vertical (MSS Type 55): Mounted vertically.
c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.

O. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.

END OF SECTION 230529
SECTION 230533 - HEAT TRACING FOR HVAC PIPING

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 heat tracing for HVAC piping with the following electric heating cables:
   1. Self-regulating, parallel resistance.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include rated capacities, operating characteristics, and furnished specialties and accessories.
   2. Schedule heating capacity, length of cable, spacing, and electrical power requirement for each electric heating cable required.

B. Shop Drawings: For electric heating cable.
   1. Include plans, elevations, sections, and attachment details.
   2. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

B. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For electric heating cables to include in operation and maintenance manuals.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace electric heating cable that fails in materials or workmanship within specified warranty period.
   1. Warranty Period: Five years from date of Substantial Completion.
PART 2 - PRODUCTS

2.1 SELF-REGULATING, PARALLEL-RESISTANCE HEATING CABLES

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

1. Chromalox, Inc.
2. Pyrotenax; Pentair Thermal Management.
3. Raychem; Pentair Thermal Management.
4. Thermon Americas Inc.

B. Comply with IEEE 515.1.

C. Heating Element: Pair of parallel No. 16 AWG, tinned, stranded copper bus wires embedded in crosslinked conductive polymer core, which varies heat output in response to temperature along its length. Terminate with waterproof, factory-assembled, nonheating leads with connectors at one end, and seal the opposite end watertight. Cable shall be capable of crossing over itself once without overheating.

D. Electrical Insulating Jacket: Flame-retardant polyolefin.

E. Cable Cover: Tinned-copper braid and polyolefin outer jacket with ultraviolet inhibitor.

F. Maximum Operating Temperature (Power On): 150 deg F.

G. Maximum Exposure Temperature (Power Off): 185 deg F.

H. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

I. Capacities and Characteristics:

1. Electrical Characteristics for Single-Circuit Connection:
   a. Volts: 120.
   b. Phase: 1.
   c. Hertz: 60.

2.2 CONTROLS

A. Remote bulb unit with adjustable temperature range from 30 to 50 deg F.

B. Snap action; open-on-rise, single-pole switch with minimum current rating adequate for connected cable.

C. Remote bulb on capillary, resistance temperature device, or thermistor for directly sensing pipe-wall temperature.

D. Corrosion-resistant, waterproof control enclosure.
2.3  ACCESSORIES

A. Cable Installation Accessories: Fiberglass tape, heat-conductive putty, cable ties, silicone end seals and splice kits, and installation clips all furnished by manufacturer, or as recommended in writing by manufacturer.

B. Warning Tape: Continuously printed "Electrical Tracing"; vinyl, at least 3 mils thick, and with pressure-sensitive, permanent, waterproof, self-adhesive back.
   2. Width for Markers on Pipes with OD, Including Insulation, 6 Inches or Larger: 1-1/2 inches minimum.

PART 3 - EXECUTION

3.1  EXAMINATION

A. Examine surfaces and substrates to receive electric heating cables for compliance with requirements for installation tolerances and other conditions affecting performance.
   1. Ensure surfaces and pipes in contact with electric heating cables are free of burrs and sharp protrusions.

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

3.2  INSTALLATION

A. Install electric heating cable across expansion joints according to manufacturer's written instructions; use slack cable to allow movement without damage to cable.

B. Install electric heating cables after piping has been tested and before insulation is installed.

C. Install electric heating cables according to IEEE 515.1.

D. Install insulation over piping with electric cables according to Section 230719 "HVAC Piping Insulation."

E. Install warning tape on piping insulation where piping is equipped with electric heating cables.

F. Set field-adjustable switches and circuit-breaker trip ranges.

3.3  CONNECTIONS

A. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

B. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
3.4 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Perform tests after cable installation but before application of coverings such as insulation, wall or ceiling construction, or concrete.
2. Test cables for electrical continuity and insulation integrity before energizing.
3. Test cables to verify rating and power input. Energize and measure voltage and current simultaneously.

B. Repeat tests for continuity, insulation resistance, and input power after applying thermal insulation on pipe-mounted cables.

C. Cables will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

3.5 PROTECTION

A. Protect installed heating cables, including nonheating leads, from damage during construction.

B. Remove and replace damaged heat-tracing cables.

END OF SECTION 230533
SECTION 230553 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

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. Equipment labels.
2. Pipe labels.
3. Valve tags.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
B. Samples: For color, letter style, and graphic representation required for each identification material and device.
C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
D. Valve numbering scheme.
E. Valve Schedules: For each piping system to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
7. Fasteners: Stainless-steel rivets or self-tapping screws.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), and the Specification Section number and title where equipment is specified.

C. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number, and identify Drawing numbers where equipment is indicated (plans, details, and schedules) and the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 PIPE LABELS

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction according to ASME A13.1.

B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to partially cover circumference of pipe and to attach to pipe without fasteners or adhesive.

C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings; also include pipe size and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions or as separate unit on each pipe label to indicate flow direction.
2. Lettering Size: Size letters according to ASME A13.1 for piping At least 1/2 inch for viewing distances up to 72 inches and proportionately larger lettering for greater viewing distances.

2.3 VALVE TAGS

A. Description: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.

1. Tag Material: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Fasteners: Brass wire-link chain or S-hook.

B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Valve-tag schedule shall be included in operation and maintenance data.
PART 3 - EXECUTION

3.1 PREPARATION

A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

3.3 EQUIPMENT LABEL INSTALLATION

A. Install or permanently fasten labels on each major item of mechanical equipment.

B. Locate equipment labels where accessible and visible.

3.4 PIPE LABEL INSTALLATION

A. Pipe Label Locations: Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Near each valve and control device.
2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations and on both sides of through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of 20 feet along each run.
7. On piping above removable acoustical ceilings.

B. Directional Flow Arrows: Arrows shall be used to indicate direction of flow in pipes, including pipes where flow is allowed in both directions.

C. Pipe Label Color Schedule:

3.5 VALVE-TAG INSTALLATION

A. Install tags on valves and control devices in piping systems, except check valves, valves within factory-fabricated equipment units, shutoff valves, faucets, convenience and lawn-watering hose connections, and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.

B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:

1. Valve-Tag Size and Shape:

END OF SECTION 230553
SECTION 230713 - DUCT INSULATION

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 insulating the following duct services:
      1. Indoor, exposed supply air.
      2. Indoor, exposed return located in unconditioned space.
      3. Outdoor, exposed supply and return.

1.3 ACTION SUBMITTALS
   A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied if any).
   B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
      1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
      2. Detail insulation application at elbows, fittings, dampers, specialties and flanges for each type of insulation.
      3. Detail application of field-applied jackets.
      4. Detail application at linkages of control devices.

1.4 INFORMATIONAL SUBMITTALS
   A. Qualification Data: For qualified Installer.
   B. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.
   C. Field quality-control reports.

1.5 QUALITY ASSURANCE
   A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.7 COORDINATION

A. Coordinate clearance requirements with duct Installer for duct insulation application. Before preparing ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.8 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS


B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
F. Extruded Polystyrene Board Insulation:

G. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type II for sheet materials.

   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Aeroflex USA, Inc.
      b. Armacell LLC.

H. Mineral-Fiber Board Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type IA or Type IB. For duct and plenum applications, provide insulation with factory-applied ASJ with factory-applied FSK jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. CertainTeed Corporation.
      b. Johns Manville; a Berkshire Hathaway company.
      c. Knauf Insulation.
      d. Manson Insulation Inc.

2.2 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.

B. Flexible Elastomeric Adhesive: Comply with MIL-A-24179A, Type II, Class I.

   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Aeroflex USA, Inc.
      b. Armacell LLC.
      c. Foster Brand; H. B. Fuller Construction Products.

C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Childers Brand; H. B. Fuller Construction Products.
      b. Eagle Bridges - Marathon Industries.
      c. Foster Brand; H. B. Fuller Construction Products.


   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Childers Brand; H. B. Fuller Construction Products.
2.3 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.

B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below ambient services.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Childers Brand; H. B. Fuller Construction Products.
   b. Foster Brand; H. B. Fuller Construction Products.
   c. Knauf Insulation.

2. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm at 43-mil dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F.
4. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.

C. Vapor-Barrier Mastic: Solvent based; suitable for indoor use on below ambient services.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Childers Brand; H. B. Fuller Construction Products.
   b. Eagle Bridges - Marathon Industries.
   c. Foster Brand; H. B. Fuller Construction Products.

2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 35-mil dry film thickness.
3. Service Temperature Range: 0 to 180 deg F.

D. Vapor-Barrier Mastic: Solvent based; suitable for outdoor use on below ambient services.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Childers Brand; H. B. Fuller Construction Products.
   b. Eagle Bridges - Marathon Industries.

2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 30-mil dry film thickness.
3. Service Temperature Range: Minus 50 to plus 220 deg F.
4. Solids Content: ASTM D 1644, 33 percent by volume and 46 percent by weight.

E. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Childers Brand; H. B. Fuller Construction Products.
b. Eagle Bridges - Marathon Industries.
c. Foster Brand; H. B. Fuller Construction Products.
d. Knauf Insulation.
e. Mon-Eco Industries, Inc.

2. Water-Vapor Permeance: ASTM F 1249, 1.8 perms at 0.0625-inch dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F.
4. Solids Content: 60 percent by volume and 66 percent by weight.

2.4 SEALANTS

A. FSK and Metal Jacket Flashing Sealants:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Childers Brand; H. B. Fuller Construction Products.
      b. Eagle Bridges - Marathon Industries.
      c. Foster Brand; H. B. Fuller Construction Products.

B. ASJ Flashing Sealants, and Vinyl and PVC Jacket Flashing Sealants:
   1. Materials shall be compatible with insulation materials, jackets, and substrates.
   2. Fire- and water-resistant, flexible, elastomeric sealant.
   3. Service Temperature Range: Minus 40 to plus 250 deg F.

2.5 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
   1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
   2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
   3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
   4. Vinyl Jacket: White vinyl with a permeance of 1.3 perms when tested according to ASTM E 96/E 96M, Procedure A, and complying with NFPA 90A and NFPA 90B.

2.6 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.
B. FSK Jacket: Aluminum-foil-face, fiberglass-reinforced scrim with kraft-paper backing.

C. Self-Adhesive Outdoor Jacket: 60-mil-thick, laminated vapor barrier and waterproofing membrane for installation over insulation located aboveground outdoors; consisting of a rubberized bituminous resin on a crosslaminated polyethylene film covered with stucco-embossed aluminum-foil facing.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
   a. Polyguard Alumaguard® All-Weather.

2.7 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Avery Dennison Corporation, Specialty Tapes Division.
   b. Compac Corporation.
   c. Ideal Tape Co., Inc., an American Biltrite Company.
   d. Knauf Insulation.

2. Width: 3 inches.
3. Thickness: 11.5 mils.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Avery Dennison Corporation, Specialty Tapes Division.
   b. Compac Corporation.
   c. Ideal Tape Co., Inc., an American Biltrite Company.
   d. Knauf Insulation.

2. Width: 3 inches.
3. Thickness: 6.5 mils.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

C. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. **Width:** 3 inches.
3. **Thickness:** 3.7 mils.
4. **Adhesion:** 100 ounces force/inch in width.
5. **Elongation:** 5 percent.
6. **Tensile Strength:** 34 lbf/inch in width.

### 2.8 SECUREMENTS

#### A. Bands:

1. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 304 or Type 316; 0.015 inch thick, 1/2 inch wide with wing seal or closed seal.
2. Aluminum: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch wide with wing seal or closed seal.

#### B. Insulation Pins and Hangers:

1. Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch- diameter shank, length to suit depth of insulation indicated.
2. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch- diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.
3. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
   - **Baseplate:** Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
   - **Spindle:** Copper- or zinc-coated, low-carbon steel, fully annealed, 0.106-inch-diameter shank, length to suit depth of insulation indicated.
   - **Adhesive:** Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
4. Nonmetal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate fastened to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
   - **Baseplate:** Perforated, nylon sheet, 0.030 inch thick by 1-1/2 inches in diameter.
   - **Spindle:** Nylon, 0.106-inch-diameter shank, length to suit depth of insulation indicated, up to 2-1/2 inches.
c. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.

5. Self-Sticking-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
   a. Baseplate: Galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
   b. Spindle: Aluminum, fully annealed, 0.106-inch-diameter shank, length to suit depth of insulation indicated.
   c. Adhesive-backed base with a peel-off protective cover.

6. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick, aluminum sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
   a. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.

7. Nonmetal Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick nylon sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
   C. Staples: Outward-clinching insulation staples, nominal 3/4-inch-wide, stainless steel or Monel.
   D. Wire: 0.062-inch soft-annealed, stainless steel.

2.9 CORNER ANGLES
   A. PVC Corner Angles: 30 mils thick, minimum 1 by 1 inch, PVC according to ASTM D 1784, Class 16354-C. White or color-coded to match adjacent surface.
   B. Aluminum Corner Angles: 0.040 inch thick, minimum 1 by 1 inch, aluminum according to ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14.

PART 3 - EXECUTION

3.1 EXAMINATION
   A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
      1. Verify that systems to be insulated have been tested and are free of defects.
      2. Verify that surfaces to be insulated are clean and dry.
   B. Proceed with installation only after unsatisfactory conditions have been corrected.
3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.

B. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of duct system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Keep insulation materials dry during application and finishing.

G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

H. Install insulation with least number of joints practical.

I. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

   1. Install insulation continuously through hangers and around anchor attachments.
   2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
   3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.

J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

K. Install insulation with factory-applied jackets as follows:

   1. Draw jacket tight and smooth.
   2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
   3. Overlap jacket longitudinal seams at least 1-1/2 inches. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches o.c.

      a. For below ambient services, apply vapor-barrier mastic over staples.
4. Cover joints and seams with tape, according to insulation material manufacturer’s written instructions, to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct flanges and fittings.

L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.4 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
   1. Seal penetrations with flashing sealant.
   2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
   3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
   4. Seal jacket to roof flashing with flashing sealant.

B. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
   1. Seal penetrations with flashing sealant.
   2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
   3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
   4. Seal jacket to wall flashing with flashing sealant.

C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

D. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.
   1. Comply with requirements in Section 078413 "Penetration Firestopping."
3.5 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

A. Seal longitudinal seams and end joints with manufacturer’s recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Apply adhesives according to manufacturer’s recommended coverage rates per unit area, for 100 percent coverage of duct and plenum surfaces.

C. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.

3.6 INSTALLATION OF MINERAL-FIBER INSULATION AND EXTRUDED POLYSTYRENE

A. Board Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer’s recommended coverage rates per unit area, for 100 percent coverage of duct and plenum surfaces.

2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.

3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:

   a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.

   b. On duct sides with dimensions larger than 18 inches, space pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.

   c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.

   d. Do not overcompress insulation during installation.

   e. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.

4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.

   a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.

   b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.

5. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Groove and score insulation to fit as closely as possible to outside and inside radius of elbows. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
6. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch-wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

3.7 FIELD-APPLIED JACKET INSTALLATION

A. Where FSK jackets are indicated, install as follows:

1. Draw jacket material smooth and tight.
2. Install lap or joint strips with same material as jacket.
3. Secure jacket to insulation with manufacturer's recommended adhesive.
4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch-wide joint strips at end joints.
5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

3.8 FINISHES

A. Insulation with ASJ, or Other Paintable Jacket Material: Paint jacket with paint system identified below.

1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.

B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.

C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.

D. Do not field paint aluminum or stainless-steel jackets.

3.9 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Inspect ductwork, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to one location(s) for each duct system defined in the "Duct Insulation Schedule, General" Article.

C. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.10 DUCT INSULATION SCHEDULE, GENERAL

A. Plenums and Ducts Requiring Insulation:
1. Indoor, exposed supply air.
2. Outdoor, exposed supply and return.

3.11 INDOOR DUCT INSULATION SCHEDULE

A. Exposed, round and flat-oval, supply-air duct insulation shall be one of the following:

1. Flexible Elastomeric: 1-1/2 inch thick.
2. Mineral-Fiber Board with Field Painted ASJ: 2 inches thick and 3-lb/cu. ft. nominal density.

B. Exposed, rectangular, supply-air duct insulation shall be one of the following:

1. Flexible Elastomeric: 1-1/2 inch thick.
2. Mineral-Fiber Board with Field Painted ASJ: 2 inches thick and 3-lb/cu. ft. nominal density.

3.12 ABOVEGROUND, OUTDOOR DUCT INSULATION SCHEDULE

A. Insulation materials and thicknesses are identified below. If more than one material is listed for a duct system, selection from materials listed is Contractor's option. Insulation on top of ductwork shall have a minimum pitch of 1/2" per foot.

B. Exposed, rectangular, supply-air duct insulation shall be one of the following:

1. Extruded Polystyrene: 2 inches thick.
2. Mineral-Fiber Board with FSK Jacket on both sides: 2 inches thick and 6-lb/cu. ft. nominal density.

C. Exposed, rectangular, return-air duct insulation shall be one of the following:

1. Extruded Polystyrene: 2 inches thick.
2. Mineral-Fiber Board with FSK Jacket on both sides: 2 inches thick and 6-lb/cu. ft. nominal density.

3.13 OUTDOOR, FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. If more than one material is listed, selection from materials listed is Contractor's option.

C. Ducts, Exposed, up to 48 Inches in Diameter or with Flat Surfaces up to 72 Inches:


END OF SECTION 230713
SECTION 230719 - HVAC PIPING INSULATION

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 insulating the following HVAC piping systems:
   1. Condensate drain piping, indoors and outdoors.
   2. Heating hot-water piping, indoors.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory and field applied if any).

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

  B. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

  B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

   1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
   2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.
1.6 DELIVERY, STORAGE, AND HANDLING
   A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.7 COORDINATION
   A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."
   B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
   C. Coordinate installation and testing of heat tracing.

1.8 SCHEDULING
   A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
   B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS
   B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
   C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
   D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
   E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
   F. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.
      1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
         a. Aeroflex USA, Inc.
b. Armacell LLC.

G. Mineral-Fiber, Preformed Pipe Insulation:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Johns Manville; a Berkshire Hathaway company.
   b. Knauf Insulation.
   c. Manson Insulation Inc.

2. Type I, 850 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ-SSL. Factory-applied jacket requirements are specified in “Factory-Applied Jackets” Article.

2.2 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.

B. Flexible Elastomeric Adhesive: Comply with MIL-A-24179A, Type II, Class I.


2.3 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.

B. Breather Mastic: Water based; suitable for indoor and outdoor use on above-ambient services.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Childers Brand; H. B. Fuller Construction Products.
   b. Foster Brand; H. B. Fuller Construction Products.
   c. Knauf Insulation.
   d. Mon-Eco Industries, Inc.

2. Water-Vapor Permeance: ASTM F 1249, 1.8 perms at 0.0625-inch dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F.
4. Solids Content: 60 percent by volume and 66 percent by weight.

2.4 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
2.5 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.

B. Metal Jacket:

1. Stainless-Steel Jacket: ASTM A 167 or ASTM A 240/A 240M.
   a. Factory cut and rolled to size.
   b. Material, finish, and thickness are indicated in field-applied jacket schedules.
   c. Moisture Barrier for Outdoor Applications: 3-mil-thick, heat-bonded polyethylene and kraft paper.
   d. Factory-Fabricated Fitting Covers:
      1) Same material, finish, and thickness as jacket.
      2) Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
      3) Tee covers.
      4) Flange and union covers.
      5) End caps.
      6) Beveled collars.
      7) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

2.6 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.
   1. Width: 3 inches.
   2. Thickness: 11.5 mils.
   4. Elongation: 2 percent.
   5. Tensile Strength: 40 lbf/inch in width.
   6. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

2.7 SECUREMENTS

A. Bands:
   1. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 304; 0.015 inch thick, 1/2 inch wide with wing seal or closed seal.

B. Staples: Outward-clinching insulation staples, nominal 3/4-inch-wide, stainless steel or Monel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
1. Verify that systems to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

B. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Keep insulation materials dry during application and finishing.

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Apply adhesives, mastics, and sealants at manufacturer’s recommended coverage rate and wet and dry film thicknesses.

K. Install insulation with factory-applied jackets as follows:
   1. Draw jacket tight and smooth.
   2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
   3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches o.c.
   4. Cover joints and seams with tape, according to insulation material manufacturer’s written instructions, to maintain vapor seal.
   5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

O. For above-ambient services, do not install insulation to the following:

1. Vibration-control devices.
2. Testing agency labels and stamps.
3. Nameplates and data plates.
5. Handholes.
6. Cleanouts.

3.4 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
4. Seal jacket to roof flashing with flashing sealant.

B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.

C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
4. Seal jacket to wall flashing with flashing sealant.

D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
3.5 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.

2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.

3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.

4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.

5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.

6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.

7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.

8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.

9. Stencil or label the outside insulation jacket of each union with the word "union." Match size and color of pipe labels.

C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

3.6 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
B. Insulation Installation on Pipe Flanges:
   1. Install pipe insulation to outer diameter of pipe flange.
   2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
   3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
   4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:
   1. Install mitered sections of pipe insulation.
   2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:
   1. Install preformed valve covers manufactured of same material as pipe insulation when available.
   2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
   3. Install insulation to flanges as specified for flange insulation application.
   4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.7 INSTALLATION OF MINERAL-FIBER INSULATION

A. Insulation Installation on Straight Pipes and Tubes:
   1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
   2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
   3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward-clinched staples at 6 inches o.c.
   4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:
   1. Install preformed pipe insulation to outer diameter of pipe flange.
   2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
   3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
   4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:
1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.8 FIELD-APPLIED JACKET INSTALLATION

A. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

3.9 FINISHES

A. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.

B. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.

C. Do not field paint aluminum or stainless-steel jackets.

3.10 PIPING INSULATION SCHEDULE, GENERAL

A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

3.11 INDOOR PIPING INSULATION SCHEDULE

A. Condensate and Equipment Drain Water below 60 Deg F:

1. All Pipe Sizes: Insulation shall be one of the following:
   a. Flexible Elastomeric: 3/4 inch thick.
   b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 3/4 inch thick.

B. Heating-Hot-Water Supply and Return, 200 Deg F and Below:

1. NPS 2 and Smaller: Insulation shall be the following:

3.12 OUTDOOR, ABOVEGROUND PIPING INSULATION SCHEDULE

A. Condensate and Equipment Drain Water below 60 Deg F:

1. All Pipe Sizes: Insulation shall be the following:

   a. Flexible Elastomeric: 1 inch thick.

3.13 OUTDOOR, FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. Piping, Exposed:

1. Stainless Steel, Type 304 or 316, Smooth 2B Finish: 0.016 inch thick.

END OF SECTION 230719
SECTION 232113 - HYDRONIC PIPING

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 pipe and fitting materials and joining methods for the following:
      1. Copper tube and fittings.
      2. Steel pipe and fittings.
      3. Plastic pipe and fittings.

1.3 ACTION SUBMITTALS
   A. Product Data: For each type of the following:
      1. Pipe.
      2. Fittings.

1.4 INFORMATIONAL SUBMITTALS
   A. Coordination Drawings: Piping layout, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
      1. Suspended ceiling components.
      2. Other building services.
      3. Structural members.
   B. Qualification Data: For Installer.
   C. Welding certificates.
   D. Field quality-control reports.

1.5 QUALITY ASSURANCE
   A. Steel Support Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Hydronic piping components and installation shall be capable of withstanding the following minimum working pressure and temperature unless otherwise indicated:

1. Hot-Water Heating Piping: 100 psig at 200 deg F.
2. Pool Water Heating Piping: 80 psig at 100 deg F.
3. Condensate-Drain Piping: 80 psig at 100 deg F.

2.2 COPPER TUBE AND FITTINGS

A. Drawn-Temper Copper Tubing: ASTM B 88, Type M.

2.3 STEEL PIPE AND FITTINGS

A. Steel Pipe: ASTM A 53/A 53M, black steel with plain ends; welded and seamless, Grade B, and wall thickness as indicated in "Piping Applications" Article.


C. Malleable-Iron Unions: ASME B16.39; Classes 150, 250, and 300 as indicated in "Piping Applications" Article.

D. Steel Pipe Nipples: ASTM A 733, made of same materials and wall thicknesses as pipe in which they are installed.

2.4 PLASTIC PIPE AND FITTINGS

A. PVC Plastic Pipe: ASTM D 1785, with wall thickness as indicated in "Piping Applications" Article.


2.5 JOINING MATERIALS

A. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.

B. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

C. Solvent Cements for PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
2.6 VALVES

A. Bronze Ball Valves, Two-Piece with Full Port and Stainless-Steel Trim:

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

   a. Apollo Flow Controls; Conbraco Industries, Inc.
   b. Crane; Crane Energy Flow Solutions.
   c. Milwaukee Valve Company.
   d. NIBCO INC.

2. Description:

   b. SWP Rating: 150 psig.
   c. CWP Rating: 600 psig.
   d. Body Design: Two piece.
   e. Body Material: Bronze.
   f. Ends: Threaded.
   g. Seats: PTFE.
   h. Stem: Stainless steel.
   i. Ball: Stainless steel, vented.
   j. Port: Full.

B. Bronze Swing Check Valves with Bronze Disc, Class 150:

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

   a. Apollo Flow Controls; Conbraco Industries, Inc.
   b. Crane; Crane Energy Flow Solutions.
   c. Jenkins Valves; Crane Energy Flow Solutions.
   d. Milwaukee Valve Company.
   e. NIBCO INC.

2. Description:

   a. Standard: MSS SP-80, Type 3.
   b. CWP Rating: 300 psig.
   c. Body Design: Horizontal flow.
   e. Ends: Threaded.
   f. Disc: Bronze.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

A. Hot-water heating piping, aboveground, NPS 2 and smaller, shall be any of the following:

1. Type L, drawn-temper copper tubing, wrought-copper fittings, and soldered joints.
2. Schedule 40, Grade B steel pipe; Class 150, malleable-iron fittings; cast-iron flanges and flange fittings; and threaded joints.

B. Pool water heating piping, aboveground, NPS 2 and smaller, shall be the following:
   1. Schedule 80 CPVC plastic pipe and fittings and solvent-welded joints.

C. Condensate-Drain Piping: Type M, drawn-temper copper tubing, wrought-copper fittings, and soldered joints.

3.2 VALVE APPLICATIONS

A. Hot-water heating piping, aboveground, NPS 2 and smaller, shall be the following:
   1. Bronze Ball Valves, Two-Piece with Full Port and Stainless-Steel Trim.
   2. Bronze Swing Check Valves with Bronze Disc, Class 150.

B. Pool water heating piping, aboveground, NPS 2 and smaller, shall be the following:
   1. CPVC plastic ball valves. Balls must be full-port design and fully sphere shape. ball valves shall be pressure-rated for 250 PSI at 70°F. equal to Hayward TB Series True Union Ball Valves

3.3 PIPING INSTALLATIONS

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping to permit valve servicing.

F. Install piping at indicated slopes.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Install piping to allow application of insulation.

J. Select system components with pressure rating equal to or greater than system operating pressure.

K. Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.
L. Install drains, consisting of a tee fitting, NPS 3/4 ball valve, and short NPS 3/4 threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage.

M. Install piping at a uniform grade of 0.2 percent upward in direction of flow.

N. Reduce pipe sizes using eccentric reducer fitting installed with level side up.

O. Install branch connections to mains using tee fittings in main pipe, with the branch connected to the bottom of the main pipe. For up-feed risers, connect the branch to the top of the main pipe.

P. Install unions in piping, NPS 2 and smaller, adjacent to valves, at final connections of equipment, and elsewhere as indicated.

Q. Install shutoff valve immediately upstream of each dielectric fitting.

R. Comply with requirements in Section 230553 "Identification for HVAC Piping and Equipment" for identifying piping.

S. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."

T. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 230518 "Escutcheons for HVAC Piping."

3.4 DIELECTRIC FITTING INSTALLATION

A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.

B. Dielectric Fittings for NPS 2 and Smaller: Use dielectric nipples.

3.5 HANGERS AND SUPPORTS

A. Comply with requirements in Section 230529 "Hangers and Supports for HVAC Piping and Equipment" for hanger, support, and anchor devices. Comply with the following requirements for maximum spacing of supports.

B. Install the following pipe attachments:

1. Adjustable steel clevis hangers for individual horizontal piping less than 20 feet long.
2. Adjustable roller hangers and spring hangers for individual horizontal piping 20 feet or longer.
3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet or longer, supported on a trapeze.
4. Spring hangers to support vertical runs.
5. Provide copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.
6. On plastic pipe, install pads or cushions on bearing surfaces to prevent hanger from scratching pipe.

C. Install hangers for steel piping with the following maximum spacing and minimum rod sizes:

1. NPS 3/4: Maximum span, 7 feet.
2. NPS 1: Maximum span, 7 feet.
3. NPS 1-1/2: Maximum span, 9 feet.
4. NPS 2: Maximum span, 10 feet.
5. NPS 2-1/2: Maximum span, 11 feet.
6. NPS 3 and Larger: Maximum span, 12 feet.

D. Install hangers for drawn-temper copper piping with the following maximum spacing and minimum rod sizes:

1. NPS 3/4: Maximum span, 5 feet; minimum rod size, 1/4 inch.
2. NPS 1: Maximum span, 6 feet; minimum rod size, 1/4 inch.
3. NPS 1-1/4 Maximum span, 7 feet; minimum rod size, 3/8 inch.
4. NPS 1-1/2: Maximum span, 8 feet; minimum rod size, 3/8 inch.
5. NPS 2: Maximum span, 8 feet; minimum rod size, 3/8 inch.
6. NPS 2-1/2: Maximum span, 9 feet; minimum rod size, 3/8 inch.
7. NPS 3 and Larger: Maximum span, 10 feet; minimum rod size, 3/8 inch.

E. Plastic Piping Hanger Spacing: Space hangers according to pipe manufacturer's written instructions for service conditions. Avoid point loading. Space and install hangers with the fewest practical rigid anchor points.

3.6 PIPE JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.

D. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

E. Plastic Piping Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
2. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
3. PVC Pressure Piping: Join ASTM D 1785 schedule number, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule number PVC pipe and socket fittings according to ASTM D 2855.
4. PVC Nonpressure Piping: Join according to ASTM D 2855.
3.7 FIELD QUALITY CONTROL

A. Prepare hydronic piping according to ASME B31.9 and as follows:

1. Leave joints, including welds, uninsulated and exposed for examination during test.
2. Provide temporary restraints for expansion joints that cannot sustain reactions due to test pressure. If temporary restraints are impractical, isolate expansion joints from testing.
3. Flush hydronic piping systems with clean water; then remove and clean or replace strainer screens.
4. Isolate equipment from piping. If a valve is used to isolate equipment, its closure shall be capable of sealing against test pressure without damage to valve. Install blinds in flanged joints to isolate equipment.

B. Perform the following tests on hydronic piping:

1. Use ambient temperature water as a testing medium unless there is risk of damage due to freezing. Another liquid that is safe for workers and compatible with piping may be used.
2. While filling system, use vents installed at high points of system to release air. Use drains installed at low points for complete draining of test liquid.
3. Isolate expansion tanks and determine that hydronic system is full of water.
4. Subject piping system to hydrostatic test pressure that is not less than 1.5 times the system's working pressure. Test pressure shall not exceed maximum pressure for any vessel, pump, valve, or other component in system under test. Verify that stress due to pressure at bottom of vertical runs does not exceed 90 percent of specified minimum yield strength or 1.7 times the "SE" value in Appendix A in ASME B31.9, "Building Services Piping."
5. After hydrostatic test pressure has been applied for at least 10 minutes, examine piping, joints, and connections for leakage. Eliminate leaks by tightening, repairing, or replacing components, and repeat hydrostatic test until there are no leaks.
6. Prepare written report of testing.

C. Perform the following before operating the system:

1. Open manual valves fully.
2. Inspect pumps for proper rotation.
3. Set makeup pressure-reducing valves for required system pressure.
4. Inspect air vents at high points of system and determine if all are installed and operating freely (automatic type), or bleed air completely (manual type).
5. Set temperature controls so all coils are calling for full flow.
6. Inspect and set operating temperatures of hydronic equipment, such as boilers, chillers, cooling towers, to specified values.
7. Verify lubrication of motors and bearings.

END OF SECTION 232113
SECTION 233113 - METAL DUCTS

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. Single-wall rectangular ducts and fittings.
   2. Single-wall round ducts and fittings.
   4. Duct liner.
   5. Sealants and gaskets.
   6. Hangers and supports.

B. Related Sections:
   1. Section 230593 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
   2. Section 233300 "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.

B. Structural Performance: Duct hangers and supports shall withstand the effects of gravity loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"

C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of the following products:
   1. Liners and adhesives.
   2. Sealants and gaskets.

B. Shop Drawings:
1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
2. Factory- and shop-fabricated ducts and fittings.
3. Duct layout indicating sizes, configuration, liner material, and static-pressure classes.
4. Elevation of top of ducts.
5. Dimensions of main duct runs from building grid lines.
6. Fittings.
7. Reinforcement and spacing.
8. Seam and joint construction.
9. Penetrations through fire-rated and other partitions.
10. Equipment installation based on equipment being used on Project.
11. Locations for duct accessories, including dampers, turning vanes, and access doors and panels.
12. Hangers and supports, including methods for duct and building attachment and vibration isolation.

C. Delegated-Design Submittal:

1. Sheet metal thicknesses.
2. Joint and seam construction and sealing.
3. Reinforcement details and spacing.
4. Materials, fabrication, assembly, and spacing of hangers and supports.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Duct installation in congested spaces, indicating coordination with general construction, building components, and other building services. Indicate proposed changes to duct layout.
2. Suspended ceiling components.
3. Structural members to which duct will be attached.
4. Size and location of initial access modules for acoustical tile.
5. Penetrations of smoke barriers and fire-rated construction.
6. Items penetrating finished ceiling including the following:
   a. Luminaires.
   b. Air outlets and inlets.
   c. Speakers.
   d. Sprinklers.
   e. Access panels.
   f. Perimeter moldings.

B. Welding certificates.

C. Field quality-control reports.

1.6 QUALITY ASSURANCE


B. Welding Qualifications: Qualify procedures and personnel according to the following:


C. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-up."

D. ASHRAE/IES Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6.4.4 - "HVAC System Construction and Insulation."

PART 2 - PRODUCTS

2.1 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.2 SINGLE-WALL ROUND DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
C. Tees and Laterals: Select types and fabricate according to SMACNA’s "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA’s "HVAC Duct Construction Standards - Metal and Flexible."

2.3 SHEET METAL MATERIALS

A. General Material Requirements: Comply with SMACNA’s "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
   2. Finishes for Surfaces Exposed to View: Mill phosphatized.

C. Aluminum Sheets: Comply with ASTM B 209 Alloy 3003, H14 temper; with mill finish for concealed ducts, and standard, one-side bright finish for duct surfaces exposed to view.

D. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
   1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.

E. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.4 DUCT LINER

A. Flexible Elastomeric Duct Liner: Preformed, cellular, closed-cell, sheet materials complying with ASTM C 534, Type II, Grade 1; and with NFPA 90A or NFPA 90B.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Aeroflex USA, Inc.
      b. Armacell LLC.
      c. Ductmate Industries, Inc.
   2. Surface-Burning Characteristics: Maximum flame-spread index of 25 and maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
   3. Liner Adhesive: As recommended by insulation manufacturer and complying with NFPA 90A or NFPA 90B.

B. Shop Application of Duct Liner: Comply with SMACNA’s "HVAC Duct Construction Standards - Metal and Flexible," Figure 7-11, "Flexible Duct Liner Installation."
   1. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.
2. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.
3. Butt transverse joints without gaps, and coat joint with adhesive.
4. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.
5. Do not apply liner in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and dimensions of standard liner make longitudinal joints necessary.
6. Apply adhesive coating on longitudinal seams in ducts with air velocity of 2500 fpm.
7. Secure liner with mechanical fasteners 4 inches from corners and at intervals not exceeding 12 inches transversely; at 3 inches from transverse joints and at intervals not exceeding 18 inches longitudinally.
8. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profiles or are integrally formed from duct wall. Fabricate edge facings at the following locations:
   a. Fan discharges.
   b. Intervals of lined duct preceding unlined duct.
   c. Upstream edges of transverse joints in ducts where air velocities are higher than 2500 fpm or where indicated.
9. Terminate inner ducts with buildouts attached to fire-damper sleeves, dampers, turning vane assemblies, or other devices. Fabricated buildouts (metal hat sections) or other buildout means are optional; when used, secure buildouts to duct walls with bolts, screws, rivets, or welds.

2.5 SEALANT AND GASKETS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.

B. Solvent-Based Joint and Seam Sealant:
   1. Application Method: Brush on.
   2. Base: Synthetic rubber resin.
   4. Solids Content: Minimum 60 percent.
   5. Shore A Hardness: Minimum 60.
   7. Mold and mildew resistant.
   8. Maximum Static-Pressure Class: 10-inch wg, positive or negative.
   10. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

C. Flanged Joint Sealant: Comply with ASTM C 920.
   2. Type: S.
   3. Grade: NS.
   5. Use: O.

D. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.
2.6 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."

D. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.

E. Steel Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492.

F. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

G. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

H. Trapeze and Riser Supports:
   3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.

B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

C. Install ducts in maximum practical lengths.

D. Install ducts with fewest possible joints.

E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.

F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.

I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.

J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.

K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Section 233300 "Air Duct Accessories" for fire and smoke dampers.


3.2 INSTALLATION OF EXPOSED DUCTWORK

A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.

B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.

C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.

D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.

E. Repair or replace damaged sections and finished work that does not comply with these requirements.

3.3 DUCT SEALING

A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

B. Seal ducts at a minimum to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":

1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
2. Outdoor, Supply-Air Ducts: Seal Class A.
3. Outdoor, Return-Air Ducts: Seal Class A.
4. Conditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class B.
5. Conditioned Space, Return-Air Ducts: Seal Class B.
3.4 HANGER AND SUPPORT INSTALLATION

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."

B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.

1. Where practical, install concrete inserts before placing concrete.
2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
5. Do not use powder-actuated concrete fasteners for seismic restraints.

C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.

D. Hangers Exposed to View: Threaded rod and angle or channel supports.

E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.

F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.5 CONNECTIONS

A. Make connections to equipment with flexible connectors complying with Section 233300 "Air Duct Accessories."

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.6 PAINTING

A. Paint interior of metal ducts that are visible through registers and grilles and that do not have duct liner. Apply one coat of flat, black, latex paint over a compatible galvanized-steel primer.

3.7 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Duct System Cleanliness Tests:

1. Visually inspect duct system to ensure that no visible contaminants are present.
2. Test sections of metal duct system, chosen randomly by Owner, for cleanliness according to "Vacuum Test" in NADCA ACR, "Assessment, Cleaning and Restoration of HVAC Systems."
   a. Acceptable Cleanliness Level: Net weight of debris collected on the filter media shall not exceed 0.75 mg/100 sq. cm.

C. Duct system will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

3.8 DUCT CLEANING

A. Clean new duct system(s) before testing, adjusting, and balancing.

3.9 START UP

A. Air Balance: Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC."

3.10 DUCT SCHEDULE

A. Fabricate ducts with aluminum sheet steel except as otherwise indicated and as follows:

B. Supply Ducts:
   1. Ducts Connected to Air-Handling Units:
      a. Pressure Class: Positive 3-inch wg.
      b. Minimum SMACNA Seal Class: A.
      c. SMACNA Leakage Class for Rectangular: 6.
      d. SMACNA Leakage Class for Round and Flat Oval: 6.

C. Return Ducts:
   1. Ducts Connected to Air-Handling Units:
      a. Pressure Class: Positive or negative 3-inch wg.
      b. Minimum SMACNA Seal Class: A.
      c. SMACNA Leakage Class for Rectangular: 6.
      d. SMACNA Leakage Class for Round and Flat Oval: 6.

D. Intermediate Reinforcement:
   1. Aluminum Ducts: Aluminum.

E. Liner:
   1. Supply Air Ducts: Flexible elastomeric, 1 inch thick. Apply to interior of duct within 15 feet of fan.
   2. Return Air Ducts: Flexible elastomeric, 1 inch thick. Apply to interior of duct within 15 feet of fan.
F. Elbow Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
   
a. Velocity 1000 to 1500 fpm:
   
   1) Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
   2) Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.
   3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."

   b. Velocity 1500 fpm or Higher:
   
   1) Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
   2) Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
   3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."

2. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
   
a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
   b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
   c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."

G. Branch Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-6, "Branch Connection."
   
a. Rectangular Main to Rectangular Branch: 45-degree entry.
   b. Rectangular Main to Round Branch: Spin in.

2. Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees."
   
a. Velocity 1000 fpm or Higher: 45-degree lateral.

END OF SECTION 233113
SECTION 233300 - AIR DUCT ACCESSORIES

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:
   2. Flange connectors.
   3. Turning vanes.
   4. Flexible connectors.
   5. Duct accessory hardware.

1.3 ACTION SUBMITTALS
A. Product Data: For each type of product.
   1. For turning vanes, volume dampers, flange connectors and flexible connectors.
B. Shop Drawings: For duct accessories. Include plans, elevations, sections, details and attachments to other work.
   1. Detail duct accessories fabrication and installation in ducts and other construction. Include dimensions, weights, loads, and required clearances; and method of field assembly into duct systems and other construction. Include the following:
      a. Special fittings.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION
B. Comply with SMACNA’s "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
2.2 MATERIALS

A. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
   2. Exposed-Surface Finish: Mill phosphatized.

B. Aluminum Sheets: Comply with ASTM B 209, Alloy 3003, Temper H14; with mill finish for concealed ducts and standard, 1-side bright finish for exposed ducts.

C. Extruded Aluminum: Comply with ASTM B 221, Alloy 6063, Temper T6.

D. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.

E. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.3 MANUAL VOLUME DAMPERS

A. Standard, Aluminum, Manual Volume Dampers:
   1. Standard leakage rating, with linkage outside airstream.
   2. Suitable for horizontal or vertical applications.
   3. Frames: Hat-shaped, 0.10-inch-thick, aluminum sheet channels; frames with flanges for attaching to walls and flangeless frames for installing in ducts.
   4. Blades:
      a. Multiple or single blade.
      b. Parallel- or opposed-blade design.
      c. Stiffen damper blades for stability.
      d. Roll-Formed Aluminum Blades: 0.10-inch-thick aluminum sheet.
      e. Extruded-Aluminum Blades: 0.050-inch-thick extruded aluminum.
   6. Bearings:
      a. Oil-impregnated bronze or Molded synthetic.
      b. Dampers in ducts with pressure classes of 3-inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
   7. Tie Bars and Brackets: Aluminum.

B. Damper Hardware:
   2. Include center hole to suit damper operating-rod size.
   3. Include elevated platform for insulated duct mounting.
2.4 FLANGE CONNECTORS

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

1. CL WARD & Family Inc.
2. Ductmate Industries, Inc.
3. Hardcast, Inc.

B. Description: Add-on or roll-formed, factory-fabricated, slide-on transverse flange connectors, gaskets, and components.

C. Material: aluminum.

D. Gage and Shape: Match connecting ductwork.

2.5 TURNING VANES

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

1. Aero-Dyne Sound Control Co.
2. CL WARD & Family Inc.
3. Ductmate Industries, Inc.
4. Duro Dyne Inc.
5. Elgen Manufacturing.
6. Hardcast, Inc.
7. METALAIRE, Inc.
8. SEMCO LLC.

B. Manufactured Turning Vanes for Metal Ducts: Curved blades of galvanized sheet steel; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.

C. General Requirements: Comply with SMACNA’s "HVAC Duct Construction Standards - Metal and Flexible"; Figures 4-3, "Vanes and Vane Runners," and 4-4, "Vane Support in Elbows."

D. Vane Construction: Double wall.

2.6 FLEXIBLE CONNECTORS

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

1. CL WARD & Family Inc.
2. Ductmate Industries, Inc.
3. Duro Dyne Inc.
4. Elgen Manufacturing.
5. Hardcast, Inc.
6. Ventfabrics, Inc.

B. Materials: Flame-retardant or noncombustible fabrics.

C. Coatings and Adhesives: Comply with UL 181, Class 1.
D. Metal-Edged Connectors: Factory fabricated with a fabric strip 3-1/2 inches wide attached to two strips of 2-3/4-inch-wide, 0.028-inch-thick, 0.032-inch-thick aluminum sheets. Provide metal compatible with connected ducts.

E. Outdoor System, Flexible Connector Fabric: Glass fabric double coated with weatherproof, synthetic rubber resistant to UV rays and ozone.

1. Minimum Weight: 24 oz./sq. yd..
2. Tensile Strength: 530 lbf/inch in the warp and 440 lbf/inch in the filling.
3. Service Temperature: Minus 50 to plus 250 deg F.

2.7 DUCT ACCESSORY HARDWARE

A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct-insulation thickness.

B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.

B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.

C. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.

1. Install steel volume dampers in steel ducts.
2. Install aluminum volume dampers in aluminum ducts.

D. Set dampers to fully open position before testing, adjusting, and balancing.

E. Install test holes at fan inlets and outlets and elsewhere as indicated.

F. Install flexible connectors to connect ducts to equipment.

G. For fans developing static pressures of 5-inch wg and more, cover flexible connectors with loaded vinyl sheet held in place with metal straps.

H. Connect flexible ducts to metal ducts with adhesive plus sheet metal screws.

I. Install duct test holes where required for testing and balancing purposes.
3.2 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Operate dampers to verify full range of movement.
2. Inspect turning vanes for proper and secure installation.

END OF SECTION 233300
SECTION 233716 - FABRIC AIR-DISTRIBUTION 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 continuous, tubular, fabric air-distribution devices.

1.3 ACTION SUBMITTALS
A. Product Data: For each type of product.
   1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
B. Shop Drawings: For fabric air-distribution devices.
   1. Include plans, elevations, sections, and suspension and attachment details.
C. Samples for Initial Selection: For diffusers with factory-applied color finishes.
D. Samples for Verification: For diffusers, in manufacturer's standard sizes to verify color selected.
E. Submit manufacturer's drawings indicating size / placement of distribution method, and mounting/installation instructions
F. Submit manufacturer's technical product data for fabric distribution method
G. Submit manufacturer's performance data for each fabric duct system, including airflow rate, inlet velocity, static pressure and exit velocity out of duct system
H. Submit manufacturer's maintenance data.

1.4 INFORMATIONAL SUBMITTALS
A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved:
   1. Ceiling suspension assembly members.
   2. Method of attaching hangers to building structure.
   3. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
B. Source quality-control reports.
1.5 WARRANTY

A. Manufacturer must provide a 10 Year Non-Prorated Warranty. Prorated warranties are not accepted.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. DuctSox Corp. Sedona XM
2. FabricAir Inc.
3. Prihoda, Premium

2.2 PERFORMANCE REQUIREMENTS

A. Continuous tubular diffuser materials shall be listed and labeled as complying with UL 2518, UL 723, NFPA 90A and NFPA 90B.

B. Air permeability of fabric will comply with ASTM D737.

C. Fire Retardant: Must meet the requirements in NFPA 90-A, ICC AC-167 and UL2518

2.3 CONTINUOUS TUBULAR DIFFUSERS

A. Description:

2. Shape: Round.
3. Air-Outlet Configuration: laser cut perforations and hole pattern with diffusion-holes sized and spaced by the manufacturer using computer modeling along the length of the diffusion device.

B. Duct Connection Type: Round zipper.

C. Accessories:

1. Quick-connect joint.
2. Snap hooks.
3. SS inlet clamp for securing to metal outlet connection point
4. Cleanout zipper.
5. Zippered inlet connection
6. Fabric dampers at each inlet.
7. Draw cords.
8. hooks which slide into track profile or snap on to wire/cable or continuous fabric strip which slides into track.
9. Hardware to include cable, cable clamps, turnbuckles, and tie down straps as required.
10. Plastic Coated Stainless Steel Cable – all other components Stainless Steel.
11. Tensioning device to remove wrinkles/creases.
12. Removable support hoops.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.

END OF SECTION 233716
SECTION 238416.13 - OUTDOOR, MECHANICAL DEHUMIDIFICATION UNITS

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 packaged, factory-assembled and -tested, refrigerant-type, outdoor, mechanical dehumidification units designed for outdoor installation.

B. Packaged system designed for natatorium environment control including:

1. Dehumidification
2. Unit mounted hot water coil for space heating
3. Cooling mode with heat rejection to an integral factory mounted outdoor air cooled fluid cooler (dry-cooler)
4. Pool water heating from reclaimed compressor waste heat
5. Unit mounted minimum Exhaust Fan and Purge/Economizer Fan
6. Unit mounted minimum Outdoor Air Connection
7. Purge/Economizer
8. Glycol Heat Recovery Loop between the minimum Exhaust and minimum outdoor air streams

1.3 ACTION SUBMITTALS

A. Product Data: For each type of outdoor, mechanical dehumidification unit.

1. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings: For each outdoor, mechanical dehumidification unit.

1. Include plans, elevations, sections, and mounting details.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Detail fabrication and assembly of outdoor, mechanical dehumidification units.
4. Curb Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include rails, and frames for equipment mounting.
5. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each outdoor, mechanical dehumidification unit, for tests performed by a qualified testing agency.
B. Field quality-control reports.

C. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For dehumidification units to include in emergency, operation, and maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Filters: Two set(s) of each type of filter specified.

1.7 QUALITY AND SAFETY ASSURANCE

A. The unit shall be ETL listed.

B. Unit shall be completely factory assembled, wired, piped, and test run prior to shipping. All controls shall be factory adjusted and preset to the design conditions. A factory test report shall be available upon request.

C. Live remote monitoring of the unit during factory testing shall be available via the Internet.

D. The unit shall have a mechanical vestibule where the electrical panel, compressors, pool water heat exchangers, receivers and most of the refrigeration controls are out of the process air stream.

E. Unit shall have a microprocessor controller with unit mounted refrigerant pressure transducers on each independent compressor circuit, multiple temperature sensors and an Ethernet connection for factory monitoring, adjusting and control via the internet. The refrigerant pressure transducers shall be actively used for unit control. A weekly graph of the space conditions shall be provided to the customer. Demonstration of these capabilities must be carried out at the engineer's office prior to bid day.

F. Internet Start-Up assist: The unit shall have remote factory start-up capability via the Internet.

G. The unit shall have 24-7 remote computer monitoring with automated alarm notifications and system performance alerts.

H. The unit shall have live remote service capability via the internet with the ability for field service technicians to receive service and trouble alerts via email and make adjustments via smartphone application remote control.

1.8 COORDINATION

A. Coordinate installation of roof curbs, equipment supports, and roof penetrations.
1.9  WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of outdoor, mechanical dehumidification units that fail in materials or workmanship within specified warranty period.
   1. The entire system shall have a 24 month limited parts warranty from ship date.
   2. The system shall be covered by an additional 1-year labor warranty when it is connected to the factory via live internet monitoring system from date of initial start-up.
   3. Warranty Period for Compressors: The compressor(s) shall have a 5 year warranty from ship date.
   4. The internal airside coils shall have a 10 years warranty from ship date.
   5. The drive line shall have a 5 year warranty from ship date.

PART 2 - PRODUCTS

2.1 OUTDOOR, MECHANICAL DEHUMIDIFICATION UNIT MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Dectron Internationale – Model LD.
   2. Desert Aire – Model SA.
   3. PoolPak Technologies Corporation – Model SWHP SR.
   4. Seresco – Basis of Design

B. Any submitted manufacturer must provide written guarantee of delivery of equipment within 15 weeks of submittal approval.

2.2 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1.

C. ASHRAE 62.1 Compliance: Section 5, "Systems and Equipment" and Section 7, "Construction and System Start-up."


2.3 GENERAL

A. The natatorium control system shall include:
   1. Mechanical process dehumidification
   2. Outdoor configuration
   3. Integral packaged outdoor air-cooled dry cooler for AC heat rejection.
   4. The unit shall have a unit mounted hot water heating coil, sized to meet the skin losses and outdoor air heating loads or as specified by the design engineer.
   5. Pool water heating type: coaxial
   6. Air filtration type: MERV 8 2-inch filters for return and outdoor air.
7. Purge mode and economizer mode.
9. Heat recovery between the minimum exhaust air and outdoor air streams and via a glycol run around loop.
10. Programmable microprocessor controller with Live, 24-7 remote internet access, monitoring and control.
11. Remote operator panel
12. Bacnet IP BMS interface
13. Unit shall have a service vestibule where the compressor, refrigeration specialties and control valves and all electronics are outside of process air stream.

2.4 SEQUENCE OF OPERATIONS

A. Unit shall be designed and sized to maintain the specified conditions. The unit operation shall be as follows:

B. Unit Startup

1. Power is turned on or system is restarted.
2. After a short initial delay to allow sensors to stabilize, the blower starts and operates continuously.
3. Based on unit mounted sensor feedback the unit shall begin/resume operation and will operate based on the sequence described below.

C. Airside Configuration

1. The unit delivers specified supply air continuously to the Natatorium.
2. The minimum exhaust air volume is set to meet the engineer’s schedule.
3. The minimum outdoor air volume is set to meet the engineer’s schedule.

D. Dehumidification Mode

1. Return air relative humidity is above humidity setpoint.
2. Compressor starts using Compressor Start sequence.
3. If the unit cannot maintain relative humidity within setpoint, compressor 2 will start.
4. The compressor waste heat is rejected into the glycol fluid loop which flows in parallel to the reheat coil and air conditioning air cooled heat exchanger.
5. The reheat coil has full (0-100%) modulating capabilities. The reheat output will modulate to maintain the space temperature at set point year round.

E. Air Conditioning Mode

1. Return air temperature is above room temperature setpoint.
2. Compressor starts if not already operating in dehumidification mode.
3. Unneeded compressor hot gas is diverted to a refrigerant to glycol fluid cooled heat exchanger. Up to 100% of compressor heat is rejected into the glycol fluid which in turn is pumped outdoors to an outdoor air cooled heat exchanger for 100% heat rejection at summer design ambient conditions.
4. 100% of compressor heat is rejected at the outdoor air cooled heat exchanger on a summer design day. On off peak days the reheat output will modulate to maintain the space temperature at set point year round.
5. If the unit cannot maintain return air temperature within setpoint, compressor 2 will start.

F. Space Heating Mode
1. Return air temperature is below room temperature setpoint.
2. The Microprocessor space heating output signal (0-10 volt) is sent to the heating coil controller. The signal output will regulate based on the return air temperature.

G. Pool Water Heating Mode
1. Return pool water temperature is below pool water setpoint.
2. If compressor is already operating from a Dehumidification or Air Conditioning demand, the control valves divert the compressor hot gas through the coaxial heat exchanger/pool water heater and the rest of the compressor heat is rejected at either the reheat coil or the AC heat exchanger.
3. If there is no pre-existing demand for the compressor to operate, the microprocessor sends a signal to the auxiliary pool water heater (remote by others) to operate. The compressor will not normally operate solely for a pool water heating demand unless configured to do so at the controller.

H. Exhaust Air Heat Recovery Mode
1. The minimum outdoor air damper and minimum exhaust fan are tied to the unit’s occupancy scheduler and will operate on/off as programmed.
2. Once the outdoor air temperature falls below the heat recovery setpoint (65 F adjustable) the glycol pump shall operate and circulate glycol between exhaust air and outdoor air heat recovery coils and recovering heat from the high energy/warm exhaust air and using it to preheat the incoming outside air.

I. Purge Mode
1. This mode is manually triggered by an operator when super-chlorinating the pool. It can be triggered at the operator panel (unit mounted or optional remote), WebSentry or BACnet.
2. It has an adjustable timed duration after which the system automatically resumes normal operation.
3. Once triggered by the operator:
   a. The compressors (if operating) pump down and cycle off.
   b. Signal from the microprocessor sets the exhaust fan(s) to maximum CFM.
   c. The unit mounted outdoor air dampers open fully. The return air dampers close.
   d. The system is in 100% outdoor air ventilation mode.
   e. After time period expires, all dampers and fans return to normal operating settings and the unit resumes normal operation.
   f. Unit will control heating based on supply air temperature.

J. Economizer Cooling Mode
1. Return air temperature is above room temperature setpoint.
2. The microprocessor will compare the temperature of the outside air with the cooling setpoint.
3. When outside air as determined to be suitable by the microprocessor, it will be used as the first stage of cooling.
4. Unit will switch over to using compressor(s) if outside air cannot satisfy the space temperature conditions.

K. Economizer Dehumidification Mode
1. Return air relative humidity is above humidity setpoint.
2. The microprocessor will compare the moisture content of the outside air to the dehumidification setpoint.

3. When outside air as determined to be suitable by the microprocessor, it will be used as the first stage of dehumidification.

4. Unit will switch over to using compressor(s) if outside air cannot satisfy the space humidity conditions.

L. Freeze Protection

1. Supply air temperature falls below freezestat setpoint or optional freezestat sensor indicates a freezestat condition.
2. All exhaust fans are stopped and all outdoor air dampers are fully closed.
3. Freezestat alarm is tripped. Alarm has to be manually cleared by operator.

2.5 CABINET

A. The Cabinet shall be designed for Outdoor installation and shall be 2” double walled with painted inner liner.

B. Cabinet Construction: All cabinet 16, 20, 24 gauge sheet metal shall be galvanized G90 steel or GalvalumeTM alloy, mill applied zinc phosphate primer followed by an exterior grade white silicone modified polyester top coat. The sheet metal is engineered to form a cabinet with maximum strength and rigidity. Panels shall be fastened to the frame with stainless steel hardware. Panels shall be isolated from the steel frame with dielectric gaskets to prevent galvanic corrosion. All seams shall be caulked with silicone inside and out to prevent air and water leakage.

1. Base Rails: The unit base frame shall be formed of 2 layers of 10 gauge galvanized steel. Lifting lugs shall be provided on the base frame for rigging the unit.
2. The cabinet walls shall be 20 gauge pre-painted steel, 2-inch double-wall construction with a fully painted inner metal liner and 2-inch fiberglass insulation.
3. The cabinet floor shall be comprised of a 16-gauge galvanized steel panel with a 20-gauge pre-painted steel inner liner, 2-inch double wall engineered with structural bending for maximum rigidity and be mechanically fastened to the base frame of the unit.
4. The cabinet roof shall be 20-gauge pre-painted steel, 2-inch double wall engineered with structural bending for maximum rigidity and be mechanically fastened to the base walls of the unit.
5. The cabinets shall be mechanically assembled with stainless steel 5/32” sealed pop rivets. Where bolts are required bright zinc plated bolts shall be used.
6. Access doors shall be supported on multiples hinges and have multiple compression latches to provide quick access. Doors shall be provided for entrance to all sections housing components requiring routine maintenance. Full height access doors have "hold back" latches to prevent door closure during the performance of service procedures.
7. The unit shall have non-corroding protective mesh screens on all air intake openings.
8. The units shall have non-corroding protective mesh screens covering internal fan blades, protective grates covering all floor access ports.

C. Outdoor Air Intake:

1. Purge /Economizer and Minimum Outdoor Air connections with motorized dampers and controls.

D. Insulation: The unit shall be insulated per the following standards:
1. All exterior cabinet sections shall be insulated with two (2) inch thick fiberglass inside the double walled cabinet.
2. Fire resistant rating to conform to NFPA Standard 90A and 90B.
3. Sound attenuation coefficient shall not be less than 1.02 at a frequency of 1,000 Hz as per ASTM Standard C423.
4. Thermal conductivity shall not exceed 0.26 Btu/in-h-sqft-F at 75 F.

E. Cabinet configuration shall include:

1. A filter rack with separate access doors shall be provided for the return air and minimum outdoor air streams.
2. Unit shall be equipped with a second outdoor air intake assembly with motorized 2 position extruded aluminum, insulated, silicone side-sealed damper for Purge and Economizer operation.
3. Mechanical vestibule: The unit shall have the compressor, receiver, solenoid valves and the electrical panel in a separate compartment out of the processed air stream. All components shall be serviceable while the unit is in operation without disturbing the airflow.
4. Electrical panel: The unit shall have a built-in electrical control panel in a separate compartment in order not to disturb the airflow within the dehumidifier during electrical servicing. All electrical components shall be mounted on a 16 gauge galvanized sub-panel.

2.6 FILTERS

A. Filters shall be standard sized, replaceable, off-the-shelf filters used throughout including:

B. Return Air: 2-Inch MERV 8, 30% pleated filters with rust-free non-metallic structure on a face loading rack.

C. Exhaust Air: 2-Inch MERV 8, 30% pleated filters with rust-free non-metallic structure

D. Outside Air: 2-Inch MERV 8, 30% pleated filters with rust-free non-metallic structure

2.7 COILS

A. Evaporator/dehumidifier coils shall be designed for maximum moisture removal capacity.

2. Coil shall have galvanized casing and end plates.
3. Aluminum fin and copper tubes mechanically bonded to assure high heat transfer.

B. Air reheat coils shall be sized for variable heat transfer into the air with a capacity of 100% of the compressors total required heat of rejection.

2. Coil shall have galvanized casing and end plates.
3. Aluminum fin and copper tube joints mechanically bonded to assure high heat transfer.
C. Coils shall have an 8-year warranty extension for a total of 10 years coverage.

D. Heat Recovery Coils

1. The unit shall have heat recovery between the minimum exhaust and outdoor air streams per specifications.
   a. The heat recovery coils shall be sized for heat transfer between the two air streams.
   b. The heat recovery fluid circulating between coils shall be glycol. The module shall be a complete package and independent circuit that includes a circulating pump, fill valves and expansion tank.

2. Coils shall be fully dipped and coated with a polyester/enamel coating for maximum corrosion protection. Coating shall comply with ASTM B117/D1654 and ASTM D2126 for corrosion resistance against common acids, salt and gases.

3. Aluminum fin and copper tube joints mechanically bonded to assure high heat transfer

2.8 DRAIN PANS

A. Each evaporator coil shall be provided with a positive draining, compound-sloped, baked powder paint coated aluminum drain pan with fully-welded corners to ensure zero water retention.

2.9 BLOWERS AND BLOWER MOTORS

A. Supply blowers:

1. The multiple direct driven supply air blower wheels shall be a parallel mounted array. Blowers shall be a single width/single inlet airfoil plenum type, secured a machined, ground and polished solid steel shaft. The wheel shall be G90 galvanized steel with baked powder paint coating. The shaft shall be coated with a rust inhibitor.

2. The complete blower assembly shall be statically and dynamically balanced on precision electronic balancers.

3. The blower assembly shall be mounted on a 1” deflection spring isolated rack.

4. The fan inlets shall be equipped with accidental contact protection screen.

5. Motor(s) shall be Premium efficiency painted cast iron construction TEFC, NEMA MG1-PART 31 Inverter Duty 15:1 Constant Torque Severe Duty with a service factor 1.25. Motors shall be 6 Pole 1200 RPM synchronous speed with HOA switch with motor safeties against overloading at 60 Hz operation directly on mains. Motors shall have double lip seals on both ends with regreasable bearings 254T frame and larger with Polyurea grease.

6. At least one motor shall be provided with a low motor noise and high starting torque VFD for air balancing purposes. The VFD shall have a drive efficiency of 96 to 98% with displacement power factor of 0.98, output maximum frequency of 400 Hz with torque boost. The VFD shall have protective features including: torque limit, heat sink over-temperature, current-limiting DC bus fuse, electronic motor overload with phase-to-phase and ground fault short circuit protection; current limit, over / under torque protection; over / under voltage protection; short circuit current rating: 30kA rms symmetrical and 100kA rms symmetrical.

B. Exhaust blowers:
1. The exhaust blower (EF1) sized to maintain the Natatorium’s negative pressure requirement during normal operation shall be unit mounted and its operation tied to the unit’s occupancy scheduler.

2. The blower shall be impeller plenum fan complete with backward curved, three-dimensional, profiled blades made of high performance composite material. The blower shall be completely corrosion resistant and be maintenance free a direct drive via a direct current (DC) electronic commuted (EC) motor. The EC-Motor shall have zero slippage design and have continuously variable speed control when connected to the unit’s controller.

3. The fan assembly shall be balanced in Class G 6.3 acc DIN ISO 1940, dynamic on two levels.

4. The fan assembly shall be suitable for ambient temperatures of -40°C to max. +70°C.

5. Thermal contacts installed in the windings compliant with THCL 155.

6. Drive motor in external rotor principle, sealed in protection class IP54 with moisture protection impregnation of the windings, topical protection.

7. High corrosion resistance design with high quality and reliability.

8. The exhaust fan shall be controlled from an end switch on the power open of the exhaust air damper. The exhaust dampers shall be protected by louvers to divert rain from the face of the dampers.

9. Shall be packaged with the heat recovery module.

C. Purge blowers:

1. The ventilation/economizer/purge exhaust blower (PEA) shall be unit mounted and sized to provide full exhaust from the space when operating with EF1.

2. The fan shall be direct driven axial fan made of high-strength composite material in which the motor and controller are integrated. It includes FE2owlet blades combined with guide vanes and EC commutated direct-current external rotor motors provides maximum efficiency the quietest performance. The EC motor shall have maintenance-free electronic circuitry, a rotor with permanent magnets, and an integral controller to provide the windings with electrical current so that, the motor rotates continuously and quietly. The fan is aerodynamically-optimised, sickle-blade profile, patterned with serrated trailing edge and winglets on the blade outer edge for energy and noise-optimised operation.

3. The fan assembly shall be balanced in Class G 6.3 acc DIN ISO 1940, dynamic on two levels.

4. The fan assembly shall be suitable for ambient temperatures of -40°C to max. +70°C.

5. Thermal contacts installed in the windings compliant with THCL 155.

6. Drive motor in external rotor principle, sealed in protection class IP54 with moisture protection impregnation of the windings, topical protection.

7. High corrosion resistance design with high quality and reliability.

8. The exhaust fan shall be controlled from an end switch on the power open and spring return outside air damper. The gravity exhaust dampers shall be protected by louvers to divert rain from the face of the dampers.

2.10 DAMPERS

A. Internal dampers shall be parallel blade and made from extruded anodized Aluminum with neoprene double seal tips to minimize leakage. Damper blades shall be mounted on steel rods which rotate on nylon bushings. All damper hardware shall be corrosion resistant.

B. Unit shall be provided with a power open and spring return outside air and exhaust air dampers. Dampers adjust between 0% to 100% open position.

C. Outdoor air and exhaust air dampers shall be opposed blade, power open and spring return. Dampers blades shall be 3/4? insulated type made from extruded anodized Aluminum with...
neoprene double seal tips to minimize leakage. Damper leakage shall be less than 1% of maximum flow at 4-inch W.C. differential. Damper blades shall be mounted on steel rods which rotate on nylon bushings. All damper hardware shall be corrosion resistant.

2.11 POOL WATER HEATER
A. Coaxial type with corrosion resistant cupro-nickel water circuit tubing.
B. Self-purging and self-draining counter flow design.
C. Water circuit piping shall be transparent braided hose, for visual water flow confirmation.
D. Terminating connections are PVC schedule 40 NPT fittings located at the cabinet wall for easy connection.
E. Maximum loop operating pressure: 60 psig

2.12 COMPRESSORS
A. Type: Scroll type, suction gas cooled, suitable for refrigerant R-410A
B. The compressors shall be mounted on rubber in shear isolators to prevent transmission of any noise and vibration to the space below.
C. Removable crankcase heater for liquid migration protection.
D. Compressors shall be located outside the conditioned air stream in the unit’s service vestibule.
E. Compressors shall have a 3-year warranty extension for a total of 5 years coverage.
F. Compressor manufacturer must have a wholesale outlet for replacement parts in the nearest major city.

2.13 REFRIGERATION CIRCUIT
A. The unit shall consist of two factory sealed refrigeration circuits for humidity and/or air conditioning control. No site refrigeration work shall be required.
B. Refrigeration circuit shall have pressure transducers monitoring the refrigerant high and low pressures. The refrigeration circuit shall be accessible for diagnostics, adjustment and servicing without the need of service manifold gauges.
C. Shall have solenoid control valves, check valves, a liquid line filter drier, liquid and moisture indicator, thermostatic expansion valve and pump down solenoid valve.
D. Unit shall have an externally adjustable balanced port design mechanical thermostatic expansion valve. The valve shall have a removable power head.
E. Tamper proof, hermetically sealed non-adjustable high and low pressure controls and refrigeration service valves shall be installed using Schrader type valves. Refrigeration service valves shall be located outside of the airstream.
F. Receiver shall have two refrigerant level (maximum and minimum) indicating sight glasses.

G. Suction line shall be fully insulated with ½ inch closed cell insulation.

2.14 CONTROL PANEL

A. Electrical contractor shall be responsible for external power wiring and disconnect switch fusing. Power block terminals shall be provided.

B. Factory-installed non-fused disconnect

C. Shall be mounted inside the service vestibule outside of the process air stream.

D. Blower motors shall be protected with thermal trip overloads.

E. Unit shall have a voltage monitor with phase protection.

F. Available dry contacts shall include:
   1. Alarm
   2. Blower interlock
   3. Stage 1 & 2 heating
   4. Outdoor air damper control
   5. Remote exhaust fan #1
   6. Remote exhaust fan #2
   7. Outdoor-air cooled equipment
   8. System on
   9. Auxiliary pool heater 1
   10. Heat recovery

G. Terminals shall be provided for 24 volt power to the outdoor air cooled condenser fan contactor.

H. All wiring shall be installed in accordance with UL or CSA safety electrical code regulations, and shall be in accordance with NFPA. All components used shall be UL or CSA listed.

I. Color-coding and wire numbering shall be provided for easy troubleshooting. All wires shall be in a wire duct. Wiring diagrams located near electrical panels on unit.

J. Compressors shall have a time delay start to prevent short cycling.

K. Pressure transducers for refrigerant high pressure and suction pressure shall be provided.

L. Airflow switch and dry contact for alarm shall be provided.

2.15 MICROPROCESSOR CONTROL

A. A microprocessor controller with the following characteristics will be provided:
   1. All set points and adjustments are preprogrammed at the factory during quality control and test operation.
   2. The microprocessor program has an updatable FLASH memory.
   3. The Flash memory will be updatable via an internet connection.
5. Four serial interface ports including both RS232 and RS485 types.
6. An Ethernet port with RJ-45 connector and LED activity indicator.
7. A real time clock to time stamp unit operation log with programmable 7-day occupied/unoccupied scheduling capabilities.
8. Two manual demand forced modes to allow user a manual bypass of the microprocessor in the event of controller failure.
9. Keypad and display panel shall have a backlit graphic liquid crystal display.

B. Unit shall have pressure transducers monitoring the refrigerant high and low pressures. The refrigeration circuit shall be accessible for diagnostics, adjustment and servicing without the need of service manifold gauges.

C. The following status LEDs shall be on the controller:
   1. Alarm - indicates there has been a failure requiring service.
   2. Dehumidification - indicates that the system is dehumidifying the space.
   3. Cooling - indicates that the air-conditioning mode.
   4. Pool Heating - indicates that the system is heating the pool water with recycled energy.
   5. Space Heat - indicates that the space heating is operating.
   6. Maintenance - indicates whether or not maintenance is required.
   7. Manual - indicates that the system has been set to manual operation.

D. The following set points shall be accessible and adjustable from the display panel:
   1. Space temperature
   2. Space relative humidity
   3. Pool water temperature

E. The following sensors shall be unit-mounted and monitored at the display panel. All information from these items shall be actively used in the control and operation strategies for the unit:
   1. Refrigerant high pressure
   2. Refrigerant low pressure
   3. Return air temperature
   4. Supply air temperature
   5. Return air relative humidity
   6. Entering pool water temperature
   7. Leaving pool water temperature
   8. Evaporator leaving air temperature
   9. Suction temperature
   10. Discharge temperature

F. System Fault: Shall indicate via text message to the display what systems require attention or servicing. Built-in monitoring and diagnostics shall allow the user to view the following:
   1. Power Failure
   2. Dirty air filter
   3. Refrigerant high and low pressure
   4. System off
   5. Anti-short cycle delay
2.16  AIR HEATING

A. Unit-mounted hot water, space-heating system shall be sized to meet the scheduled heating capacity and have the following characteristics:

1. Modulating control via factory mounted and wired three-way control valve.
2. Coils shall be fully dipped and coated with a polyester/enamel coating for maximum corrosion protection. Coating shall comply with ASTM B117/D1654 and ASTM D2126 for corrosion resistance against common acids, salt and gases.
3. Coil shall have galvanized casing and end plates.
4. Fin and tube joints mechanically bonded to assure high heat transfer.
5. Fin material: Aluminum
6. Tube material: Copper
7. Maximum loop operating pressure: 250 psig

2.17  AIR CONDITIONING

A. Air-cooled air conditioning via fluid cooler

B. Unit shall be equipped with air conditioning mode where excess compressor heat is rejected to a factory packaged integral outdoor air-cooled heat exchanger (aka Dry Cooler) via a single pipe set glycol fluid loop. No site refrigeration work shall be required. The unit mounted fluid cooled condenser and outdoor air-cooled heat exchanger shall both be capable of rejecting 100% of the compressor heat rejection with an air on temperature at summer design conditions.

C. Unit shall be provided with a dry contact rated for 24VAC/5A to operate the remote outdoor fluid cooler control.

D. Refrigeration circuit shall include refrigerant valves, receiver with pressure relief valve set at 550 psig, pressure control valve and pressure differential valve, and two manual shutoff valves to isolate the outdoor fluid cooler.

E. Coils shall be tested at 425 PSIG and mounted vertically for complete surface utilization. Coils shall be counter flow and have adequate capacity to dissipate the total heat rejection of the system at design conditions.

F. The fan shall be a direct driven axial fan made with a dual speed external rotor motor with innovative bionic blades in die-cast aluminum moulds.

  1. The fan assembly shall be balanced in Class G 6.3 acc DIN ISO 1940, dynamic on two levels.
  2. The fan assembly shall be suitable for ambient temperatures of -40°C to max. +70°C.
  3. Thermal contacts installed in the windings compliant with THCL 155.
  4. Drive motor in external rotor principle, sealed in protection class IP54 with moisture protection impregnation of the windings, topical protection.
  5. High corrosion resistance design with high quality and reliability.

2.18  FACTORY PERFORMANCE TESTING

A. The unit shall be thoroughly tested under factory test conditions. A copy of the test report shall be available to the engineer upon request.
B. Microprocessor controls shall be factory adjusted and preset to the design conditions during testing.

C. The unit shall be accessible for real-time monitoring while in the QC test chamber upon request.

2.19 ROOF CURBS

A. Roof Curbs:

1. Materials: Galvanized steel with corrosion-protection coating, watertight gaskets, and factory-installed wood nailer; complying with NRCA standards.

2. Curb Insulation and Adhesive: Comply with NFPA 90A or NFPA 90B.

   a. Materials: ASTM C 1071, Type I or II.
   b. Thickness: 1-1/2 inches.
   c. Application: Factory applied with adhesive and mechanical fasteners to the internal surface of curb.
   d. Liner Adhesive: Comply with ASTM C 916, Type I.
   e. Mechanical Fasteners: Galvanized steel, suitable for adhesive attachment, mechanical attachment, or welding attachment to duct without damaging liner when applied as recommended by manufacturer and without causing leakage in cabinet.
   f. Liner materials applied in this location shall have airstream surface coated with a temperature-resistant coating or faced with a plain or coated fibrous mat or fabric, depending on service-air velocity.

B. Curb Height: 18 inches.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for hot-water and pool water heating piping systems to verify actual locations of piping connections before equipment installation.

C. Examine walls, floors, and roofs for suitable conditions where dehumidification units will be installed.

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

3.2 PRODUCT DELIVERY, ACCEPTANCE, STORAGE AND HANDLING

A. Perform a thorough physical inspection of the unit upon delivery from the shipment carrier.

B. Identify and report any physical damage immediately to manufacturer.

C. If unit is to be stored prior to installation store in a clean, dry place. Protect from weather, dirt, fumes, water, construction, and physical damage.
D. Handle unit carefully during installation to prevent damage, breaking, denting and scoring.

E. Damaged units or damaged components shall not be installed. Contact manufacturer for RMA instructions.

F. Comply with manufacturer's rigging and installation instructions for unloading the unit and moving it to the final location.

3.3 CONNECTIONS

A. Where installing piping adjacent to units, allow space for service and maintenance.

B. Duct connections: Drawings indicate the general arrangements of the ducts. Connect units to ducts with flexible duct connectors. Comply with requirements for flexible duct connectors.

C. Electrical connections: Comply with requirements for power wiring, switches and motor controls in electrical sections.

3.4 START-UP

A. Detailed instructions for start up as provided by the manufacturer must be followed.

B. Installing contractor must contact the manufacturer prior to start up to confirm start up procedures.

C. Remote internet access and control must be initiated and confirmed by the factory prior to start up for extended labour warranty to be in effect.

3.5 PIPING CONNECTIONS

A. Where piping is installed adjacent to dehumidification units, allow space for service and maintenance of dehumidification units.

B. Connect condensate drain pans using minimum NPS 1-1/4 copper tubing. Extend to nearest equipment or floor drain. Construct deep trap at connection to drain pan, and install cleanout at changes in direction.

C. Hot-Water Piping: Comply with requirements in Section 232113 "Hydronic Piping" and Section 232116 Hydronic Piping Specialties." Connect to supply coil tappings with shutoff valve, return coil tappings with balancing valve, and union or flange at each connection.

D. Duct installation requirements are specified in Section 233113 "Metal Ducts." Drawings indicate the general arrangement of ducts. The following are specific connection requirements:

3.6 ELECTRICAL CONNECTIONS

A. Connect wiring according to Section 260519 "Wires and Cables."

B. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.
1. Nameplate shall be laminated acrylic or melamine plastic signs, as specified in Section 260553 "Identification for Electrical Systems."
2. Nameplate shall be laminated acrylic or melamine plastic signs with a black background and engraved white letters at least 1/2 inch high.
3. Locate nameplate where easily visible.

3.7 CONTROL CONNECTIONS

A. Install control and electrical power wiring to field-mounted control devices.

B. Connect control wiring between control devices.

C. Connect control wiring according to Section 260523 "Control-Voltage Electrical Power Cables."

D. Connect smoke detector to fire alarm system.

3.8 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

D. Perform the following tests and inspections with the assistance of a factory-authorized service representative.

   1. Leak Test: After installation, fill water coils with water, and test coils and connections for leaks. Repair leaks and retest until no leaks exist.
   2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

E. Dehumidification unit will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

3.9 CLEANING

A. Clean dehumidification units internally, on completion of installation, according to manufacturer's written instructions. Clean fan interiors to remove foreign material and construction dirt and dust. Vacuum clean fan wheels, cabinets, and coils' entering-air face.

B. After completing system installation, testing, and startup service of dehumidification units, clean filter housings and install new filters.

3.10 ADJUSTING

A. Adjust damper linkages for proper damper operation.

B. Adjust initial temperature and humidity set points.
3.11 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.
   1. Complete installation and startup checks according to manufacturer's written instructions.

B. Perform the following final checks before startup:
   1. Verify that shipping, blocking, and bracing are removed.
   2. Verify that unit is secure on mountings and supporting devices and that connections to piping, ducts, and electrical systems are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
   3. Perform cleaning and adjusting specified in this Section.
   4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify free fan wheel rotation and smooth bearing operations. Reconnect fan drive system, align belts, and install belt guards.
   5. Check lubrication of bearings, pulleys, belts, and other moving parts.
   6. Set outside- and return-air mixing dampers to minimum outside-air setting.
   7. Install clean filters.
   8. Verify that manual and automatic volume control and fire and smoke dampers in connected duct systems are in fully open position.

C. Starting procedures for dehumidification units include the following:
   1. Energize motor; verify proper operation of motor, drive system, and fan wheel. Adjust fan to indicated rpm. Replace malfunctioning motors, bearings, and fan wheels.
   2. Measure and record motor's electrical values for voltage and amperage.
   3. Manually operate dampers from fully closed to fully open position and record fan performance.

D. Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing of dehumidification unit.

E. Startup Report: Report findings during startup. Identify startup steps, corrective measures taken, and final results.

3.12 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain dehumidification units.

END OF SECTION 238416.13
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:
   1. Construction Phasing Plan and building outages
   2. Equipment Submittals and Shop Drawings
   3. Field Acceptance Testing of Equipment and Systems
   4. Operation and Maintenance Manuals

1.3 CONSTRUCTION PHASING PLAN AND BUILDING OUTAGES

A. Installation of branch circuits from existing switchboards, panelboards and MCCs shall be scheduled with the University at least two weeks in advance.

1.4 EQUIPMENT SUBMITTALS AND SHOP DRAWINGS

A. Each submittal shall be required to bear the review stamp of each contractor associated with the processing of the document. The processing of shop drawings shall follow contractual relationships between the Prime Contractor and all Subcontractors.

B. Each shop drawing submitted shall be identified by the following:
   1. Project Name
   2. Specification Section
   3. Drawing Numbers

C. Shop drawing data shall include but not be limited to:
   1. Manufacturer's catalog designation.
   2. Complete data and wiring diagrams.
   3. Dimensions, capacities, ratings, weights, materials, finishes, and storage conditions.
   4. Recommended installation procedures, performance, and conditions of performance, testing, and certifications if required.

D. Shop drawings which require coordination of two or more trades shall be required to bear the review stamp of the coordinating trades.
1. All submittals depicting multiple options or configurations shall be marked to completely identify the specified options and/or configurations. This includes all electronic submittals, which shall be identical to all submitted paper copies.

1.5 FIELD ACCEPTANCE TESTING OF EQUIPMENT AND SYSTEMS

A. Contractor shall perform a field acceptance test demonstrating components and system performs according to project and manufacturers requirements. Notify the University minimum one week prior to test. The test shall be documented and included in close-out documents.

B. Records of all torque wrench calibration and settings shall be provided

1.6 OPERATION AND MAINTENANCE MANUALS

A. The manufacturer's standard specification sheets, if generalized in any way, shall be clearly marked to show exactly which item has been supplied, what ratings are applicable, etc., and the job designation for that item shall be noted on manufacturer's specification sheet which includes all details for the specific equipment.

B. If there are differences between pieces of equipment, include a specification sheet for each, properly marked.

C. Include control diagrams, single-line diagrams, interconnection (point to point) wiring diagrams, sequence of operations, and service instructions.

D. Provide one section for preventive maintenance procedures (recommended materials and procedures, frequency, etc.).

E. Include Contractor's phone numbers and any other references required to obtain warranty service.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 260500
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. This section covers the labor and materials necessary for the Work associated with the demolition of the electrical systems as shown on Drawings and specified herein.

B. Equipment and systems to be removed include but are not limited to:

1. Low voltage disconnect switches
2. Receptacles
3. Conduit and wiring

C. The Engineer will select which materials and equipment shall remain the property of the University. The remaining materials shall become the property of the Contractor and shall be immediately transported away from the work site at the Contractor’s expense. The Contractor shall identify each item before removal and shall take precautions to prevent damage to the rest of the existing materials and equipment.

D. The Drawings for the demolition are included as references in the Contract Documents. The Contractor shall inspect the facilities to be demolished prior to submitting a Bid, to satisfy themselves as to the nature and location of Work.

E. The Contractor shall obtain all permits necessary for the Work specified herewith and disposal of the demolished materials.

F. The Contractor shall test and identify all materials requiring special handling during demolition and disposal. These shall include, but not be limited to, lead-based paint and asbestos materials. Disposal of demolished material shall follow all applicable codes and regulations.

PART 2 - PRODUCTS

2.1 GENERAL

A. The Contractor shall provide all materials and equipment in suitable and adequate quantity as required to safely accomplish the Work shown, specified herein, and as required to safely complete the project.
PART 3 - EXECUTION

3.1 DEMOLITION

A. Perform the Work in a manner to avoid damaging those parts of the structure or facility that are not intended to be removed. If, in the opinion of the Engineer, the method of demolition used may endanger or damage parts of the structure, or affect the satisfactory operation of the facilities, promptly change the method when so notified by the Engineer.

B. Remove all materials associated with existing equipment that is to be removed or relocated, unless noted otherwise.

C. Cut off concealed or embedded conduit, boxes, or other materials a minimum of ¾” below final finished surface. Patch to match existing surfaces.

3.2 DISPOSAL

A. Remove all rubble and waste material from the site. This will include, but not be limited to, the following: equipment, electrical, and other debris. Accomplish disposal offsite in accordance with all federal, state, and local laws.

B. Areas in which demolition operations are being conducted are to be cleaned upon conclusion of daily work, outage period work, or a specific work period. All rubble and waste material shall be removed from each work area in order to provide a clean area for garage operations.

C. Areas in which demolition operations are conducted and in which new work is to be performed, shall be initially cleaned by the Contractor in order to accommodate the new work.

3.3 SALVAGE

A. Rowan University shall pick from equipment and materials within the limits of demolition for their stock, any remaining items, will become the property of the Contractor.

END OF SECTION 260501
SECTION 260515
WIRES AND CABLES

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. Contractor shall furnish all labor, equipment, materials, and incidentals necessary to install wires and cables and other related work complete, as indicated on the drawings and as specified.

1.3 PRODUCT SECTION INCLUDES
A. Wire and cable (600V)
B. Splices (600V)
C. Ground wire
D. Plastic cable ties
E. Electrical tapes

1.4 REFERENCE
A. The following publications form a part of this specification to the extent referenced. The publication is referred to in the text by the basic designation only.

B. Insulated Cable Engineers Association (ICEA) Publication

1.5 QUALITY ASSURANCE
A. Wire and cable shall be delivered and stored on site in factory assembled packaging or on factory reels. All cable ends for 600 volt cable No. 4/0 and larger and all medium voltage cable shall be sealed with heat shrinkable sealant coated end caps. Hand taped caps are not acceptable. Use Tyco-Raychem ESC series or approved equal.

B. Product shall be UL listed and labeled.

1.6 SUBMITTALS
A. Product for all listed products in this section.
B. Manufacturers’ Instructions:

1. Installation instructions for each type of splicing kit
2. Installation instructions for each type of termination kit

1.7 CONDUCTOR COLOR CODING

A. Provide all single conductors and individual conductors of multi-conductor power cables with integral insulation pigmentation of the designated colors, except conductors larger than No. 6 AWG may be provided with color-coding by wrapping the conductor at each end and at all accessible locations with vinyl tape. Where this method of color-coding is used, wrap at least six full overlapping turns of tape around the conductor covering an area 1-1/2 to 2 inches wide at a visible location.

B. Phase sequences A, B, and C implies the direction of clockwise phase rotation.

C. Color shall be green for grounding conductors #6 and smaller.

PART 2 - PRODUCTS

2.1 WIRE AND CABLE (600 VOLT)

A. Building wire: Single annealed copper conductor insulated wire; 98 percent conductivity at 20 degrees C. Wires and cables manufactured more than 12 months prior to date of delivery to site shall not be used.

1. Solid conductor for feeders and branch circuits 12 AWG and smaller; larger conductors shall be stranded.
2. Stranded conductors for tray, control and communication circuits.
4. Insulation Temperature Rating: 90 degrees C.
5. Insulation Material (building wire): Thermoset – Type XHHW-2
6. Acceptable manufacturers – building wire:
   a. General Cable Corporation
   b. Southwire Company
   c. Cerro Wire
2.2 SPLICES (600 VOLTS)  
A. For above grade cable and conductor splices, provide compression type in-line splices with pre-molded GEL cover or heat shrinkable tubing cover. Cover with Tyco Raychem Gelwrap or heat shrinkable tubing ‘WCSM’ or approved equal.  
B. For below grade splices in pull boxes, manholes or cable vaults, provide compression type in line splices for two-way connections and C type compression connectors for taps or three-way connections. Cover all below grade splices with Tyco Raychem heat shrinkable tubing ‘WCSM’ or type CRSM-CT cable tap encapsulation kits.

2.3 TERMINATIONS (600 VOLTS)  
A. 600 volt terminations shall be crimp compression type bolted to equipment or set screw terminal type in equipment not suitable for compression connectors. Conductors, No. 12 and smaller shall utilize eye type compression set terminator when termination is to a bolted or set screw type terminal block.

2.4 GROUND WIRE  
A. Ground wire shall be soft drawn bare copper, sized as noted on the drawings, where direct buried or run with medium voltage cable in pull boxes, manholes, or cable vaults.

2.5 PLASTIC CABLE TIES  
A. Cable ties shall be nylon or equivalent, locking type. Use Panduit EH cross-section, PLT locking type, 250 pound loop tensile strength or approved equal.

2.6 ELECTRICAL TAPES  
A. Electrical tapes shall be as follows:  
   1. Insulating tape shall be 3M Scotch Super 33+ vinyl electrical type or equal.  
   2. Fire proofing tape shall be 3 inch wide, Scotch 3M No. 77 Fire and Electric Arc Proofing tape or equal.  
   3. Glass cloth electrical tape shall be Scotch 3M No. 69 or equal.

PART 3 - EXECUTION

3.1 GENERAL  
A. Wire and cable shall be installed in conduits and ductbanks as shown on the contract drawings. The installation shall include preparing of conduits, pulling, laying and securing of wires and cables and making conductor splices, terminal connections to equipment and devices, and performing cable tests.
B. Conduit runs shall be cleaned and free from obstructions and sharp corners prior to cable installation. A mandrel, followed by a clean, dry, tight-fitting rag shall be drawn through the conduit immediately before installing the wire or cable. The wires and cables shall be installed so that there will not be cuts or abrasions in the insulation or protective covering or kinks in the wires and cables. Gradual and uniform pulling stresses shall be applied to wires and cables. Where a lubricant is needed as an aid to the pulling of wires and cables, use only compounds acceptable to, or approved by, the cable manufacturer. Cable guides shall be installed as required in order to prevent the cable from being damaged by sharp surfaces.

3.2 CABLE PULLING

A. The contractor shall submit cable pulling calculations performed by the cable manufacturer based on actual conduit installation. The calculations shall clearly indicate that cable parameters are not exceeded for the specific conduit configuration. Splices shall be installed in manholes where required such that the cable manufacturer’s maximum pulling tension, sidewall pressure and other parameters are not exceeded during cable installation. Cable pulling plans and calculations shall be submitted to the Company ten (10) working days prior to work.

B. Wire and cable shall be inspected for damage during installation.

C. Wire and cable pulling equipment shall be equipped with an accurate gauge to allow continuous monitoring of pulling tension. Pulling tension shall not exceed manufacturers maximum recommended values for pulling tensions and sidewall pressures. Record these values and submit log to the Engineer and include in O&M manual.

D. Wire and cable shall be pulled using a tugger or winch, similar to Greenlee power puller, Ideal pulling kit, or vehicle mounted electric winch. Vehicles shall not be utilized for pulling cable.

E. The wire and cable shall be fed through a cable feeder or over sheaves in such a way that it does not contact the edge of the manhole or duct. Bending radius shall not be less than 12 times the conductor or cable diameter. The cable shall be fed straight into the duct in the pay-off manhole and straight out of the duct at the pulling manhole.

F. Wire and cable shall be lubricated at pay-off end with cable manufacturer approved cable pulling compound.

G. The pay-off reel shall be tended throughout the pulling process.

H. The rate of pull shall be constant and not exceed 50 feet per minute.

I. Prior and during cable pulling, Contractor shall pump water from pull boxes, manholes and cable vaults and keep them dry until the project is completed to allow subsequent inspections.

J. Wire and cable installation may occur in some manholes, pull boxes or cable vaults with other energized wire and cable. Contractor shall perform work in a safe manner and conform to all safety regulations.
3.3 TERMINATIONS (600 VOLTS)

A. All terminations shall be secure and tightened in accordance with the manufacturer's recommendations.

3.4 SPLICES (600 VOLTS)

A. Splices in conductors No. 12 AWG and smaller shall be made with "Scotchlok" insulated connectors of proper size for conductors being spliced. Connectors shall be PE taped. Splices in conductors No. 10 AWG and larger shall be made with pressure type solderless connectors. The splice area shall be insulated with heat shrink to provide equal or greater insulation than the original.

B. Connectors and terminal lugs shall be used for terminating stranded conductors #6 AWG and larger and shall be T&B, Ilsco, or approved equal solderless connectors.

C. Wire in panels, cabinets, pull boxes and wiring gutters shall be neatly grouped, strapped together with T&B Model Tyrap cable strap or laced with No. 12 stranded lacing twine and fanned out to the terminals.

3.5 CABLE SUPPORTS AND PROTECTION

A. Cable entering equipment shall be securely clamped or secured inside the equipment. Cable supports shall be installed in the equipment for supporting the incoming cable from the point of entrance to the point of termination.

B. Attach cables and splices to support assemblies by using nylon cable ties, Panduit EH, PLT locking type, 250 pound loop tensile strength rating.

END OF SECTION 260515
SECTION 260529
HANGERS AND SUPPORTS

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. This Section includes the following:
   1. Hangers and supports for electrical equipment and systems.

1.3 DEFINITIONS

A. RMC: Rigid metal conduit.

B. LFMC: Liquid-tight Flexible Metallic Conduit

1.4 SUBMITTALS

A. Product Data: Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of electrical support component used.
   1. Annotate to indicate application of each product submitted and compliance with requirements.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed under this Project, with a minimum structural safety factor of five times the applied force.

B. Steel Slotted Support Systems: Comply with MFMA-3, factory-fabricated components for field assembly.

   1. Manufacturers:
      a. Cooper B-Line; a division of Cooper Industries
      b. ERICO International Corporation
      c. Allied Support Systems; Power-Strut Unit
      d. Thomas & Betts Corporation
      e. Unistrut; Tyco International, Ltd.
f. Or approved equal

2. Finishes:
   a. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-3 (Metal Framing Manufacturers Association).

3. Channel Dimensions: Selected for structural loading

C. Raceway and Cable Supports: As described in NECA 1

D. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
   1. Mechanical-Expansion Anchors: Insert-wedge-type, stainless steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
      a. Manufacturers:
         1) Cooper B-Line; a division of Cooper Industries
         2) Empire Tool and Manufacturing Co., Inc.
         3) Hilti, Inc.
         4) ITW Construction Products
         5) MKT Fastening, LLC
         6) Powers Fasteners
         7) Or approved equal
   2. Concrete Inserts: Steel or malleable-iron slotted-support-system units similar to MSS Type 18; complying with MFMA-3 or MSS SP-58.
   3. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
   4. Through Bolts: Structural type, hex head, high strength. Comply with ASTM A 325
   5. Toggle Bolts: All-steel springhead type; ASTM Standard E 488
   6. Hanger Rods: Threaded steel; ANSI/MSS SP-58, SP-69

PART 3 - EXECUTION

3.1 APPLICATION
   A. Comply with NECA 1 for application of hangers and supports for electrical equipment and systems, except if requirements in this Section are stricter.

   B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.

   C. Powder-Driven Threaded Studs: Powder – Driven devices shall not be used unless specifically approved by the University Engineering Department.
3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 for installation requirements, except as specified in this Article.

B. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
2. To Existing Concrete: Expansion anchor fasteners
   To Steel: Beam clamps

C. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars. Provide minimum horizontal and vertical separation between holes and rebar.

D. Walls of light weight construction (including all stud/drywall type construction) shall be reinforced with surface mounted “unistrut” strut before hanging electrical equipment.

END OF SECTION 260529
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SECTION 260533
RACEWAYS AND BOXES

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. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

B. Related Sections include the following:

   1. Division 26 Section "Hangers and Supports for Electrical Systems" for raceways, boxes, enclosures, and cabinets.

1.3 DEFINITIONS

A. LFMC: Liquid-tight flexible metal conduit

B. RMC: Rigid metal conduit

1.4 SUBMITTALS

A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.6 COORDINATION

A. Coordinate layout and installation of raceways, boxes, enclosures, cabinets, and suspension system with other construction or existing appurtenances that penetrate ceilings or is supported by them, including light fixtures, HVAC equipment, and partition assemblies.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

A. Manufacturers:

   1. AFC Cable Systems, Inc.
   2. Alflex Inc.
   3. Anamet Electrical, Inc.; Anaconda Metal Hose
   4. Electri-Flex Co.
   5. Grinnell Co./Tyco International; Allied Tube and Conduit Div.
6. LTV Steel Tubular Products Company
7. O-Z Gedney; Unit of General Signal
8. Wheatland Tube Co.
9. Or approved equal

B. Rigid Metal Conduit: ANSI C80.1.
   1. Galvanized Rigid (Steel) Conduit (GRC)
   2. Fittings: Rigid steel conduit fittings shall be of the threaded type or compression only. Zinc based cast fittings are not permitted – use cast iron or cast steel.

C. LFMC: Flexible steel conduit with PVC jacket; Underwriters Laboratories Standard ANSI / UL-360

D. Fittings: NEMA FB 1; compatible with conduit and tubing materials

2.2 STANDARD WIRING DEVICE WALL BOXES AND ENCLOSURES

A. Manufacturer:
   1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
   3. Erickson Electrical Equipment Co.
   6. O-Z/Gedney; Unit of General Signal.
   7. Thomas & Betts Corporation.
   8. Or approved equal.

B. Sheet Metal Pull and Junction Boxes: NEMA OS 1.

2.3 WIREWAYS, PULLBOXES AND JUNCTION BOXES

A. Wireways and boxes 1,500 square inches (length by width) and smaller shall be constructed with No. 16 code gauge metal, fully seam welded, and have a bolt-on cover using stainless steel hex-head 10/32 nuts, bolts, screws, washers, etc., minimum 8” on center. The enclosure shall be U.L. 50 listed and labeled. Wireways and boxes greater than 1,500 square inches (length X width) shall be constructed with No. 14 code gauge metal with same requirements.

B. Use the following enclosure type and material:
   1. Indoor Locations: NEMA 1, galvanized steel (ASTM A653) with ANSI 61 gray polyester urethane powder finish inside and out.

C. Wireway used to splice and extend conductors into new 208V Volt switchboards shall be constructed per paragraphs 2.3A and B of this section.

D. Provide gaskets for covers of boxes in damp or wet locations.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Indoors:
1. Threaded rigid galvanized steel conduit only, except for A2 (below).
2. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC not to exceed 18”.
3. Exposed conduit in non-finished areas (mechanical/electrical equipment rooms, storage rooms, pool area etc.) shall be RGS conduit.
4. Conduit shall be supported independently from ceilings or structural steel, not by hangers with other services (e.g. pipes, ductwork, or other mechanical systems).

B. Outdoors:

1. Where elbows are required to transition from horizontal to vertical, use rigid steel conduit sweep elbows. At intersection with grade, wrap conduit with minimum two layers of black pipe tape.

C. Circuits operating above 600V: Rigid steel conduit

D. MC cable: For lighting fixture whips only

E. Minimum Raceway Size: 3/4” inch trade size

F. Raceway Fittings: Compatible with raceways and suitable for use and location.

3.2 INSTALLATION

A. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

B. Complete raceway installation before starting conductor installation.

C. Support raceways as specified in Division 26 Section, Hangars and Supports.

D. Conduit shall be supported independently from ceilings and shall not be supported on hangers with any other services (e.g. pipes, ductwork, or other mechanical systems).

E. Install temporary closures to prevent foreign matter from entering raceways.

F. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portions of bends are not visible above the finished slab.

G. Make bends and offsets so the inside diameter is not reduced. Keep legs of bends in the same plane and keep straight legs of offsets parallel, unless otherwise indicated.

H. Install exposed raceways parallel or at right angles to nearby surfaces or structural members and follow surface contours as much as possible.

1. Run parallel or banked raceways together on common supports.
2. Make parallel bends in parallel or banked runs. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.

I. Join raceways with fittings designed and approved for that purpose and make joints tight.

1. Use insulating bushings to protect conductors.

J. Terminations:
1. Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against box. Use two locknuts, one inside and one outside box.

2. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into hub so end bears against wire protection shoulder. Where chase nipples are used, align raceways so coupling is square to box; tighten chase nipple so no threads are exposed.

K. Flexible Connections: Use maximum of 18” of LFMC flexible conduit for motors and equipment subject to vibration, noise transmission, or movement, and 72” for lighting fixture whips and wiring devices. Install separate ground conductor across flexible connections.

L. Wall/Floor Penetrations: Conduits penetrating concrete floor slab or masonry walls shall have the annular space sealed with a UL approved minimum two (2) hour fire rated fire stopping assembly or material. Submit type and method for approval prior to installation.

M. Paint all medium voltage conduits, pull and junction boxes red and identify with voltage label.

3.3 CLEANING

A. After completing installation of exposed, factory-finished raceways and boxes, inspect exposed finishes and repair damaged finishes.

END OF SECTION 260533
SECTION 260553
IDENTIFICATION

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. This Section includes the following:
1. Identification labels for equipment installed under this contract.
2. Identification for conductors

1.3 SUBMITTALS

A. Product Data: For each electrical identification product.

1.4 COORDINATION

A. Coordinate identification names, abbreviations, colors, and other features with requirements in the Contract Documents.

PART 2 - PRODUCTS

2.1 Adhesive Marking Labels for Raceway: Pre-printed, flexible, self-adhesive labels with legend indicating voltage and service shall be used for identifying all exposed conduits.

A. Label Size: As follows:
2. Raceways Larger than 1-inch: 1-1/8 inches high by 8 inches long.

B. Color: Black legend on orange background.

2.2 Wire/Cable Designation Tape Markers: all splice or pull boxes, panelboards, switchboards, switchgear or other connected equipment, identify all branch circuit power and all control cables and conductors using vinyl or vinyl-cloth, self-adhesive, wraparound, cable/conductor markers with preprinted numbers and letters. Such identification shall include circuit/circuit breaker number, wire number (where applicable) gauge of conductor and either destination (at source locations) or source (at destination and intermediate locations).
2.3 Plasticized Card Stock Tags: For medium voltage and 480 volt feeder cables, provide phenolic or laminated plastic tags with machine printed legend to suit the application. Provide black legend on white background, except as otherwise indicated on project documents, and eyelet for fastening. Tags shall identify circuit/circuit breaker number, conductor gauge, and destination (at source location) or source (at destination and intermediate locations). See drawings for medium voltage tag detail.

2.4 Nameplates: Engraved three-layer laminated plastic, black letters on white background. Printed plastic tape labels shall be permitted for use in identifying internal components in electrical enclosures, and for panelboard branch circuit identification, only. Embossed, anodized metal nameplates supplied by manufacturers for switchgear, transformers, etc., for equipment ratings are acceptable, but these do not circumvent the need for additional nameplates bearing the project equipment identification.

2.5 Provide nameplates with equipment name and drawing schedule identification for all electrical equipment including panelboards, cabinets, switchgear, switchboards, starters, and fire alarm devices. Devices serving a dedicated load shall be identified in a similar manner.

2.6 Fasteners for Plastic Laminate and Metal nameplates: Provide self-tapping stainless steel screws or No. 10/32 minimum stainless steel machine screws with nuts, and flat and lock washers. Glue-on or self-adhesive nameplates are not permitted.

2.7 Cable Ties: Provide fungus-inert, self-extinguishing, one piece, self-locking nylon cable ties 0.18 inch minimum width. Fifty (50) pounds minimum tensile strength and suitable for a temperature range from -50 degrees F. to plus 350 degrees F.

2.8 All receptacle cover plates, including outdoor weatherproof receptacles, shall be identified as to panel and circuit number; this information shall be identified by means of a printed self-adhesive label. Label shall be translucent or clear polyester with black lettering, waterproof, and scratchproof.

2.9 Control wiring shall be identified and tagged at all terminals to correspond with wire numbers or other identifications as shown on Vendor’s drawings.
PART 3 - EXECUTION

3.1 APPLICATION

A. Branch-Circuit Conductor Identification: Where there are conductors for more than three branch circuits in same junction or pull box, use color-coding conductor tape and write-on tags. Identify each ungrounded conductor according to source and circuit number.

B. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and Operation and Maintenance Manual.

1. Labeling Instructions:
   a. Equipment: Engraved, laminated acrylic. Unless otherwise indicated, provide a single line of text with 1/2-inch high letters on 1-1/2-inch high label; where 2 lines of text are required, use labels 2 inches high. Secure to equipment with four screws.

2. Equipment to Be Labeled:
   a. Switchboards
   b. Disconnect switches
   c. Control panels
   d. Miscellaneous enclosures

3.2 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

C. Color-Coding for Phase and Ground Identification:
   1. 120/240V, 1 Phase: Black, Red, White, Green
   2. 120/208V, 3 Phase: Black, Red, Blue, White, and Green
   3. 277/480V, 3 Phase: Brown, Orange, Yellow, Gray. This also applies to 277V lighting branch circuits (apply color code to maintain phase identity)
   4. Isolated Ground Conductors: Green with yellow tracer(s)
   5. Medium Voltage, 3 Phase: Identify each phase with the letters A, B and C

D. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

E. Conduits and pullboxes containing circuits 600 Volts and above shall be painted red. Install voltage labels on conduit at 10’ intervals.

END OF SECTION 260553